Transportation Design for Communities

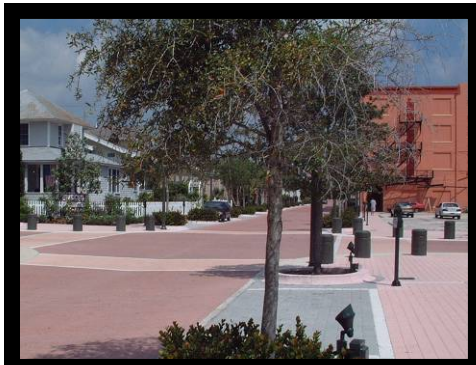
Hosted by the Center for Quality Growth and Regional Development at the Georgia Institute of Technology

Module 4: Reframing Key Transportation Conventions

May 12, 2006 Atlanta, GA

Instructor: Troy Russ, AICP

The primary transportation challenge of any integrated Land Use and Transportation Study is to balance the success and livability of the local community with its responsibility to accommodate regional transportation demand. Livability is focused on balancing vehicular service requirements with local business, neighborhood and pedestrian needs. Module 4 presents the how several key transportation obstacles to Livable Street Design should be approached and enable the community development community to engage transportation professionals and ensure transportation facilities are designed for communities. Key transposition conventions examined will include: project design traffic, roadway functional classifications, design speed, and roadway design standards design standards.



Transportation Design for Communities

Executive Seminar

MODULE 4: Reframing Key Transportation Conventions

Prepared by:

Urban Design & Transportation Studio

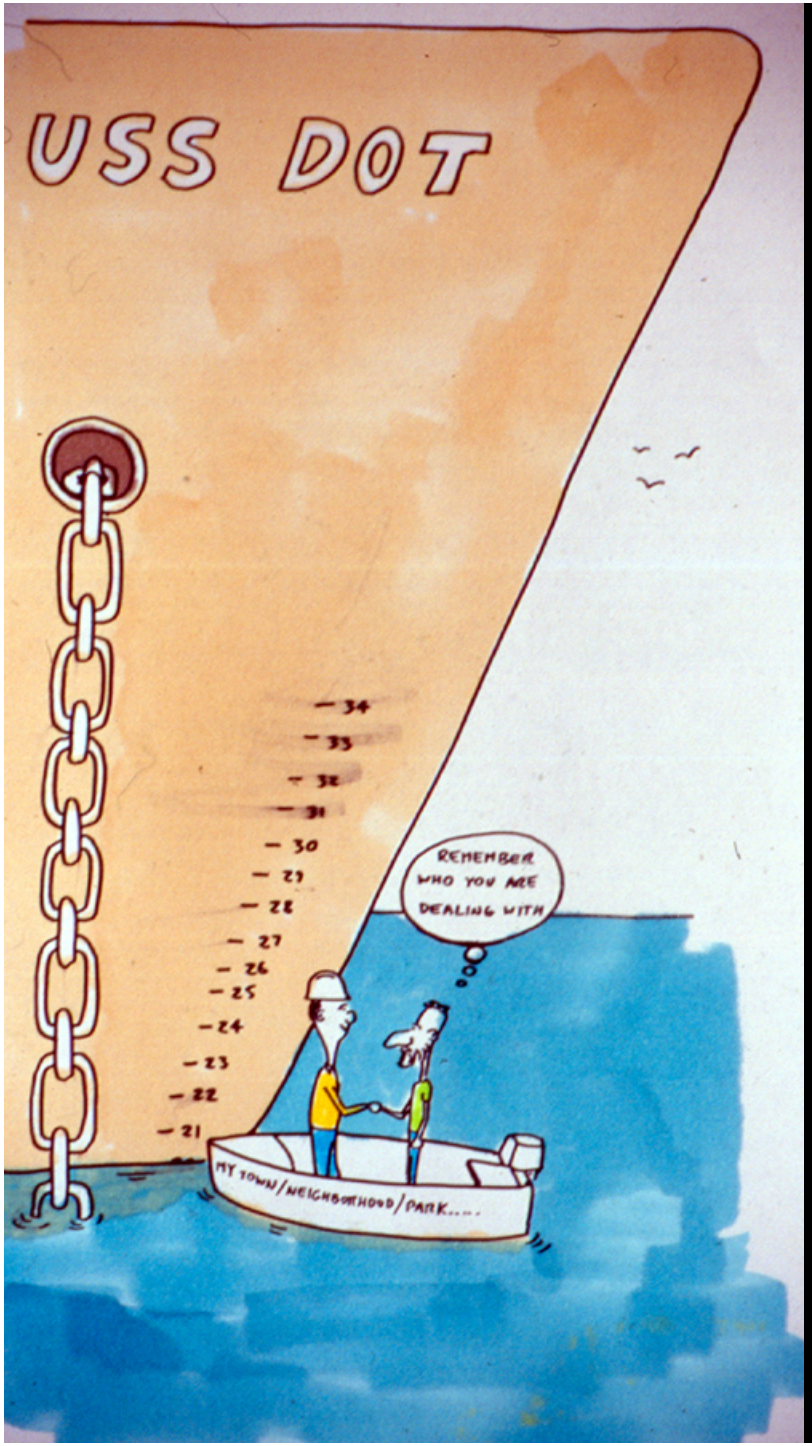
Glatting Jackson Kercher Anglin Lopez Rinehart, Inc.

Georgia Institute of Technology

Center for Quality Growth & Regional Development

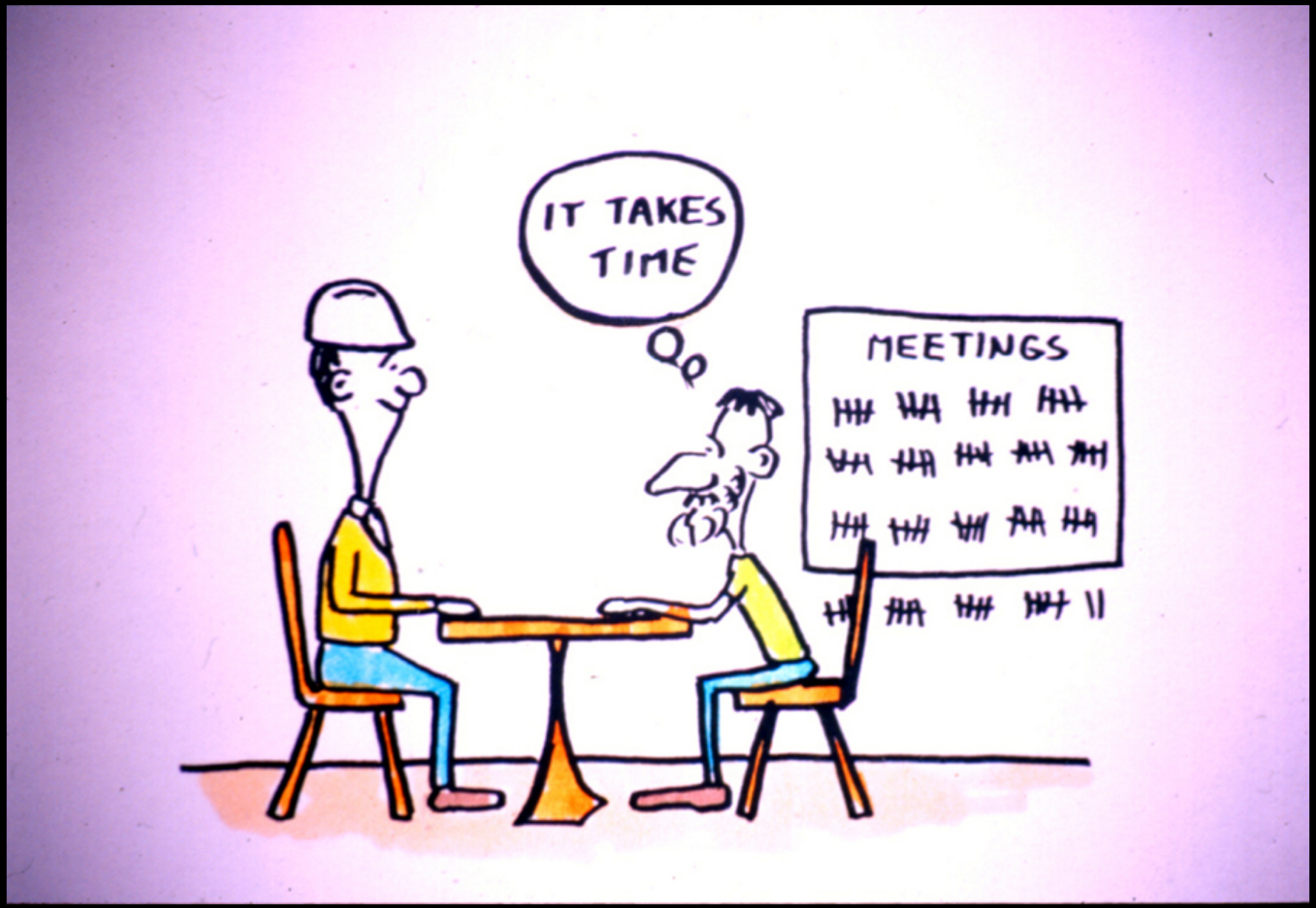
May 12, 2006

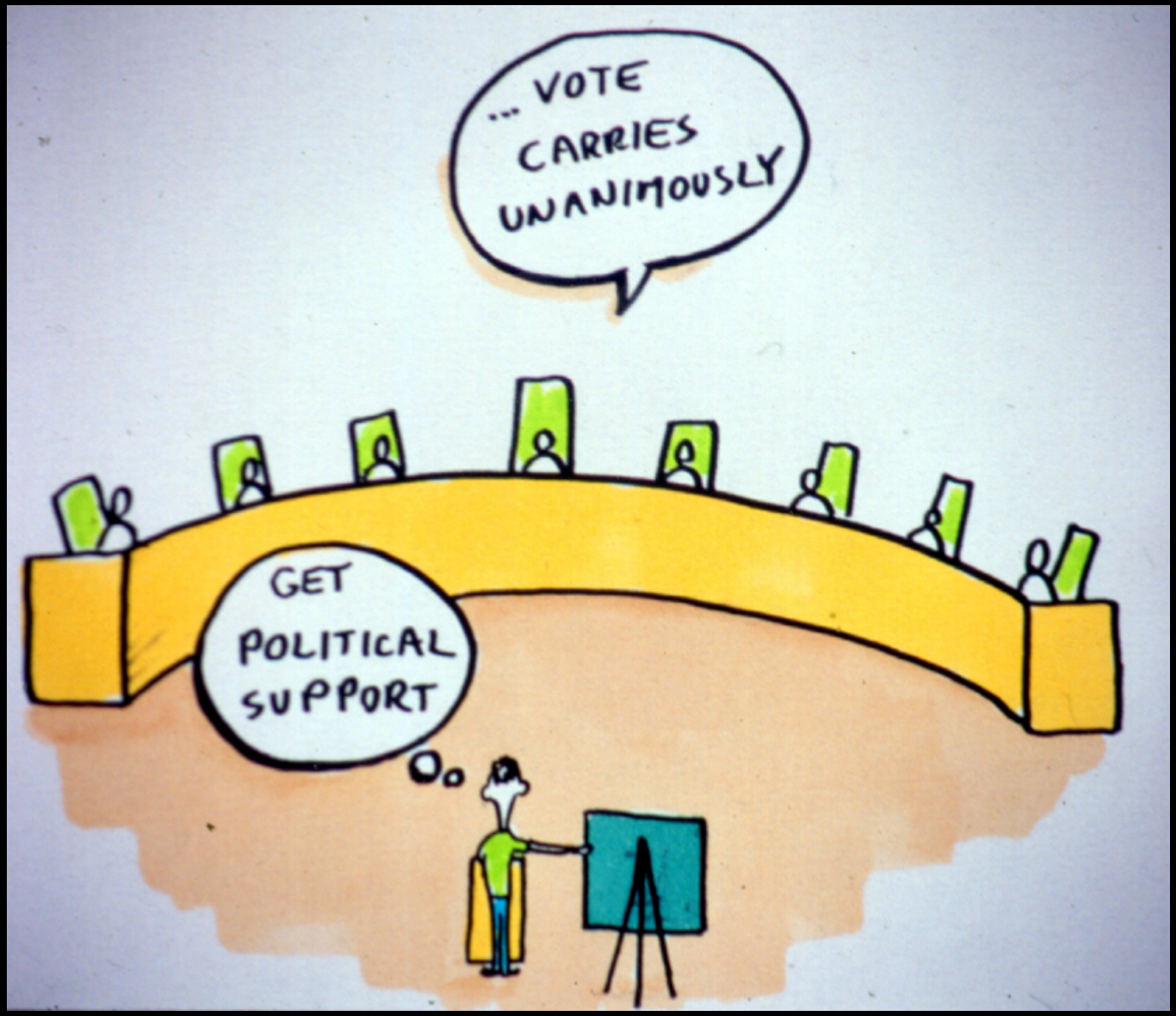
Reframing Key Transportation Conventions



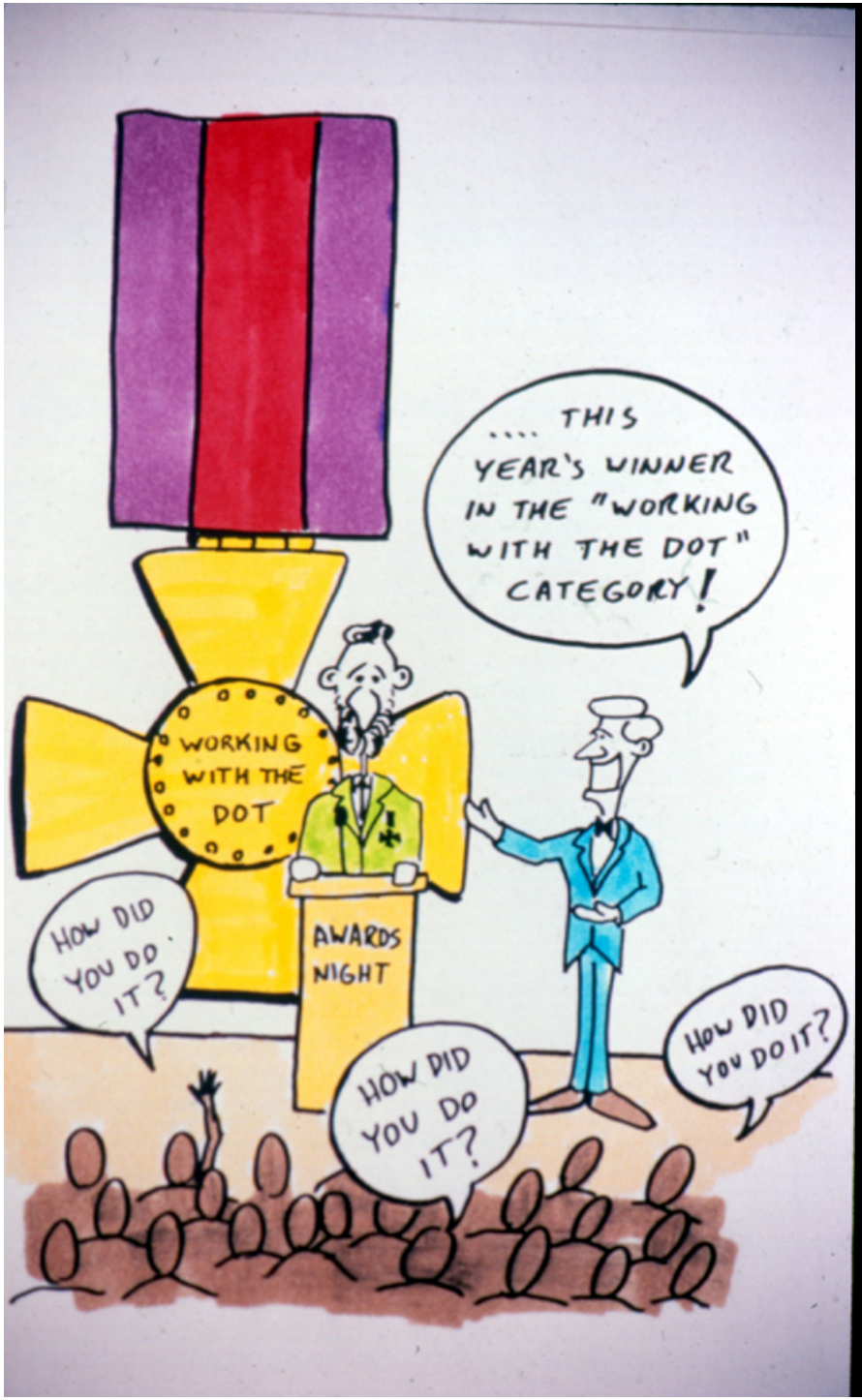
Reframing Key Transportation Conventions

Reframing Key Transportation Conventions


IT TAKES TIME
MEETINGS


... VOTE CARRIES UNANIMOUSLY
GET POLITICAL SUPPORT

Reframing Key Transportation Conventions



Reframing Key Transportation Conventions

Determine Functional Classification

Hierarchy & Functional Class
Context

then

Establish Design Controls

Design Traffic

- The Role of the Regional Model
- Understanding the Travel Patterns – Trip Types
- Vehicle Types
- Defining the Context - Network and Mode Choice
- Role of Micro-Simulation
- Interpreting the Results – Capacity & Travel Time

Design Speed

- Target Speed & Context
- Minimums vs. Maximums
- Freight Routes
- Roadway Safety
- Speed / Flow Relationship
- Speed & Roadway Geometrics

then

Fit Design Elements

Roadway Design Standards

- Geometric (Sight Distance / Stopping Distance)
- Dimensions
- Design Elements – Trees / Parking / Transit Stops
- AASHTO Design Guidelines
- State and Local Design Standards
- Design Variances and Exceptions

Functional

Classification

Reframing Key Transportation Conventions

Hierarchy & Functional Class

Determine Functional Classification

Hierarchy & Functional Class

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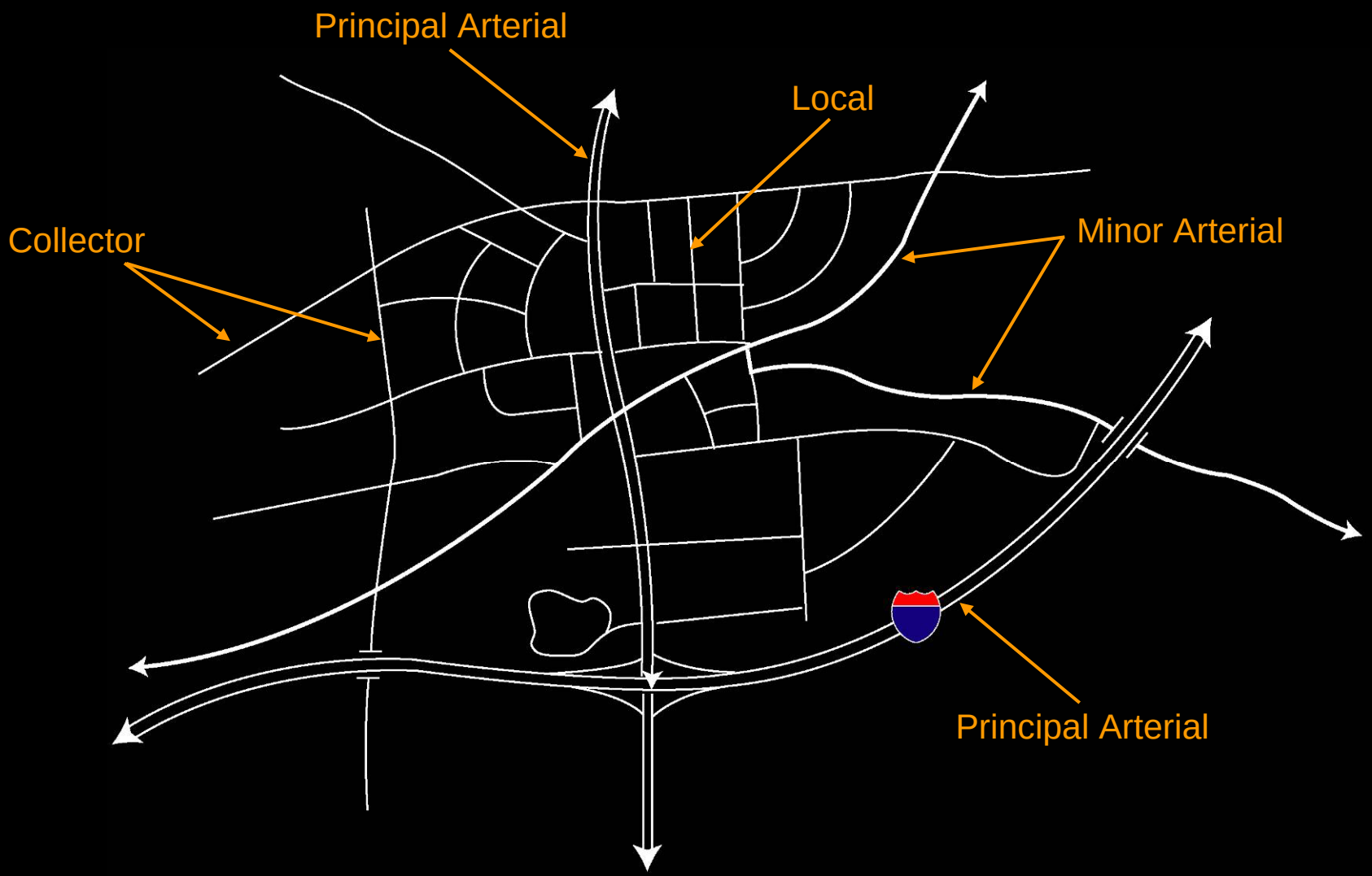
Reframing Key Transportation Conventions

Hierarchy & Functional Class

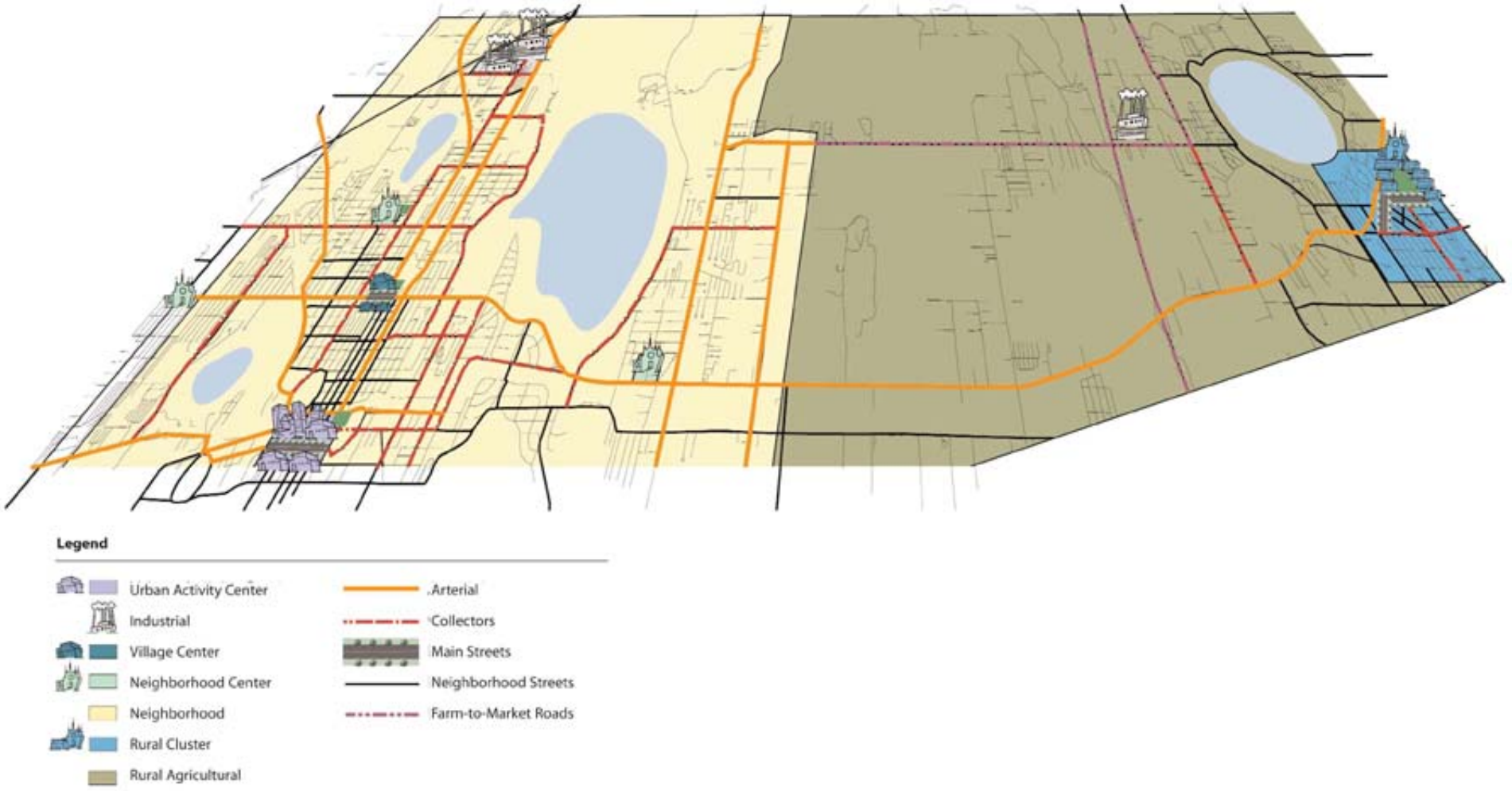


Functional Classification

Reframing Key Transportation Conventions

Hierarchy & Functional Class

Functional Class: Intuitive, Popular



Functional Classification

50 mph

35 mph

45 mph

35 mph
School
Zone

40 mph

25 mph
School
Zone

Reframing Key Transportation Conventions

Hierarchy & Functional Class

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Hierarchy & Functional Class

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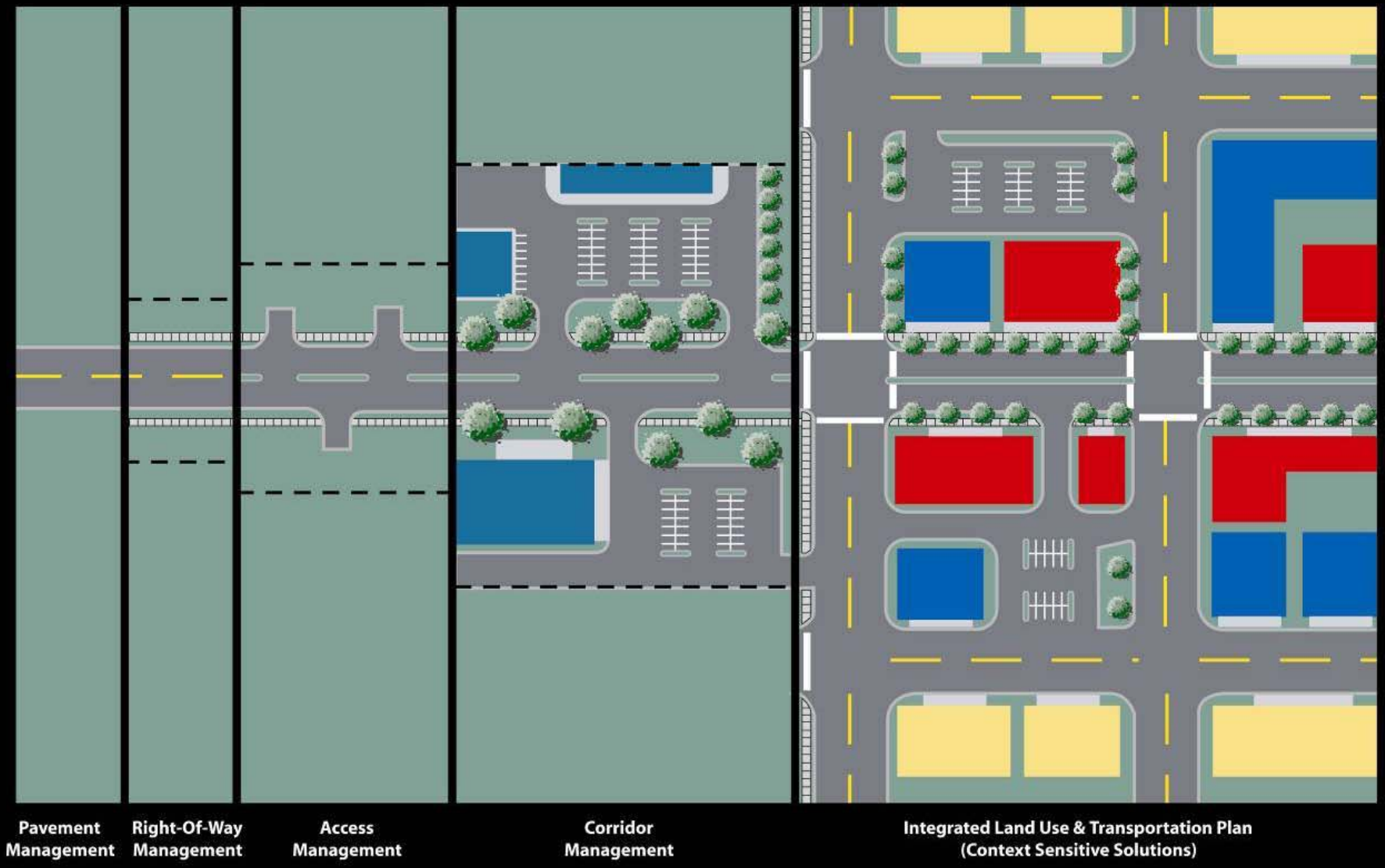
Reframing Key Transportation Conventions

Context



Evolution of Integrated Land Use and Transportation Plans

Reframing Key Transportation Conventions

Context

Urban:

Highway
Arterial
Collector
Local

Parkway
Boulevard
Avenue
Main Street
Street
Lane

Suburban:

Rural:

T1

T2

T3

T4

T5

T6

Rural-to-Urban Transect

Drawings by James Wassell

Reframing Key Transportation Conventions

Context

Urban Activity Center

Village Center

Neighborhood Center

Neighborhood

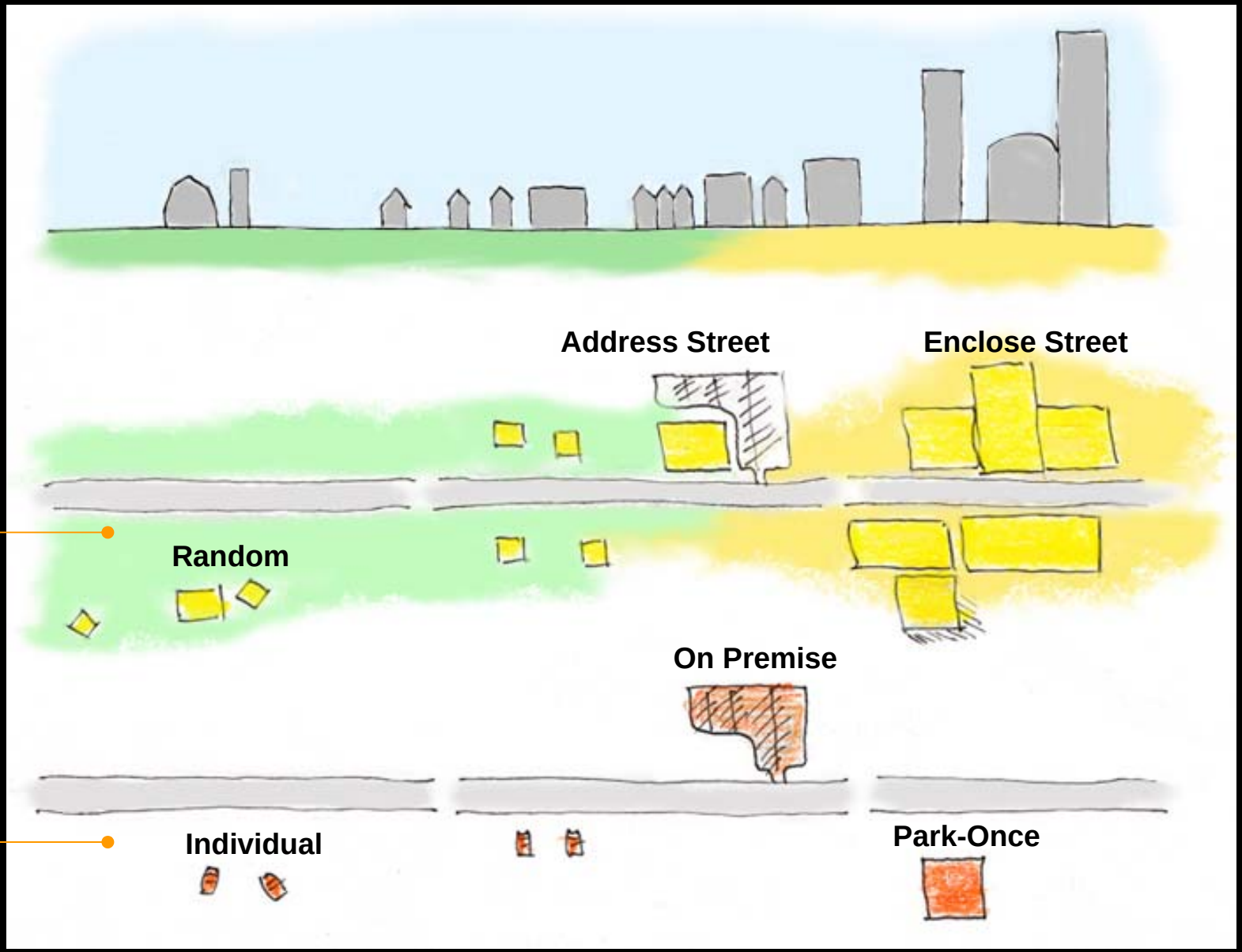
Industrial

Rural Cluster

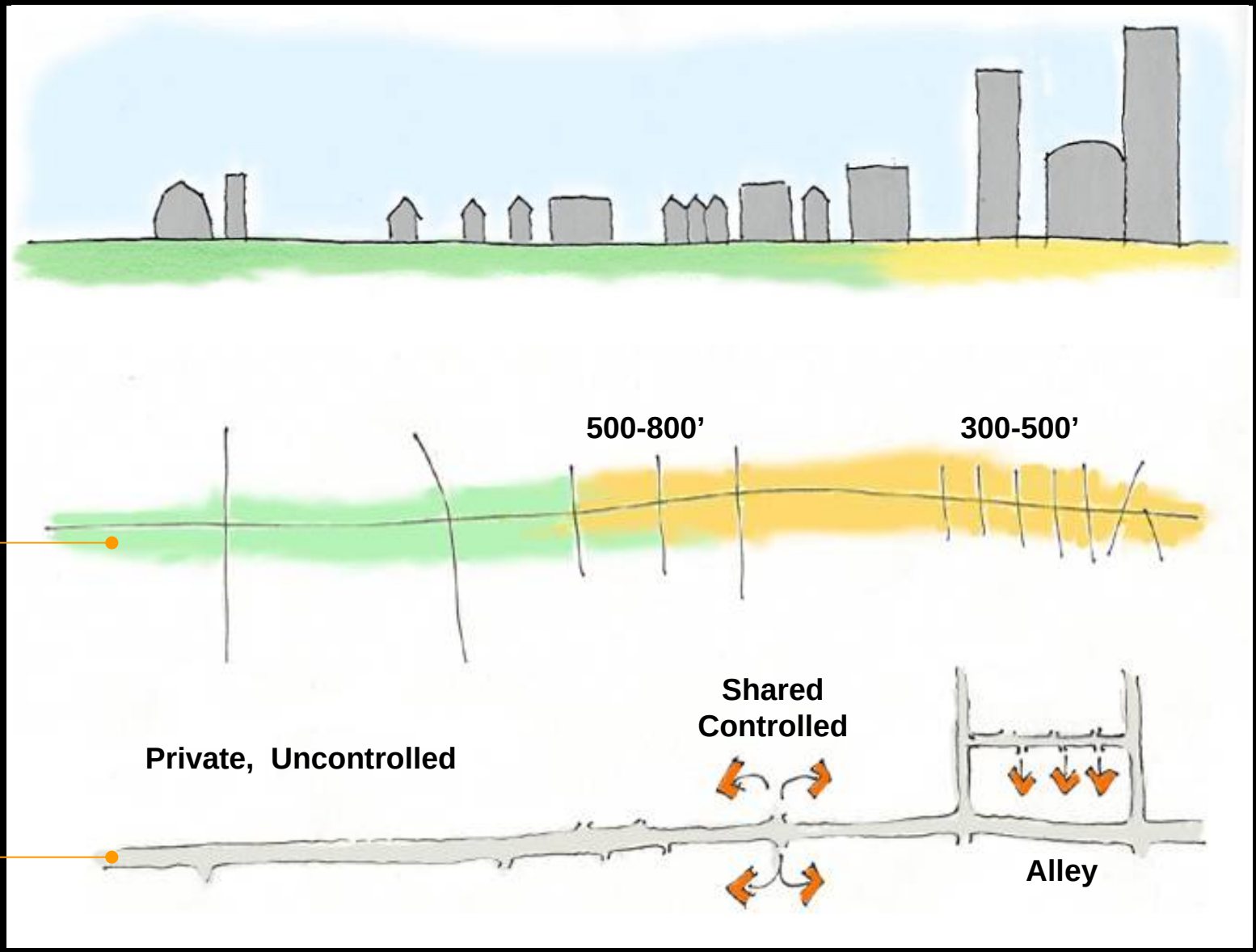
Rural Agricultural Area

Transect Points

Frontage Elements



Network Elements



50 mph

35 mph

45 mph

35 mph
School
Zone

40 mph

25 mph
School
Zone

TRANSITION FROM RURAL TO URBAN

TRANSITION FROM RURAL TO URBAN

Reframing Key Transportation Conventions

Context

TRANSITION FROM RURAL TO URBAN

TRANSITION FROM RURAL TO URBAN

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TRANSITION FROM RURAL TO URBAN

Reframing Key Transportation Conventions

Context

Highway
Arterial
Collector
Local

Parkway
Boulevard
Avenue
Main Street
Street
Lane

Urban:
- Commercial
- Retail
- Mixed Use
- Residential
- Industrial

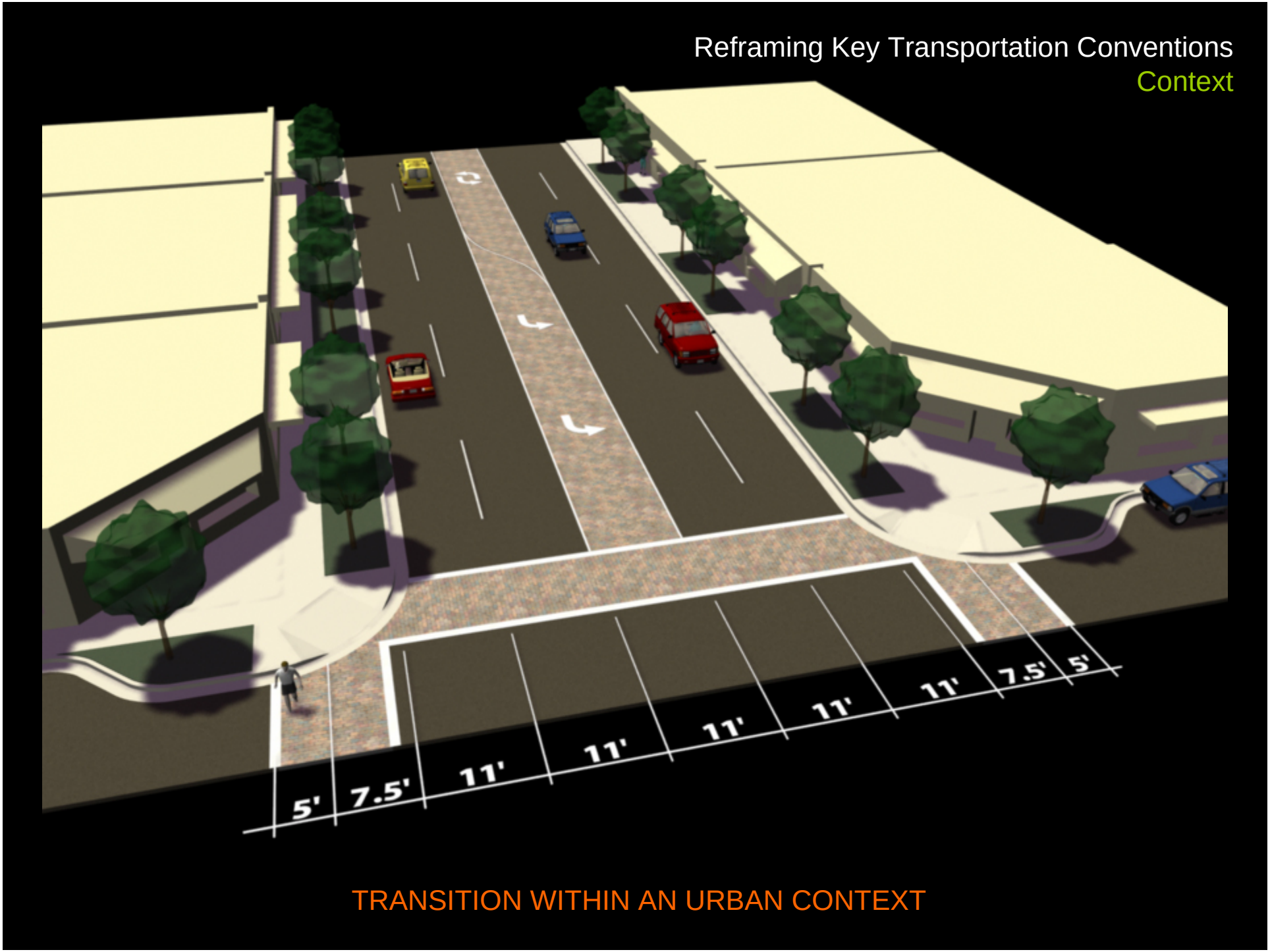
Suburban:
- Commercial
- Retail
- Mixed-use
- Residential
- Industrial

Rural:
- Commercial
- Retail
- Mixed Use
- Residential
- Industrial

TRANSITION WITHIN AN URBAN CONTEXT

Reframing Key Transportation Conventions

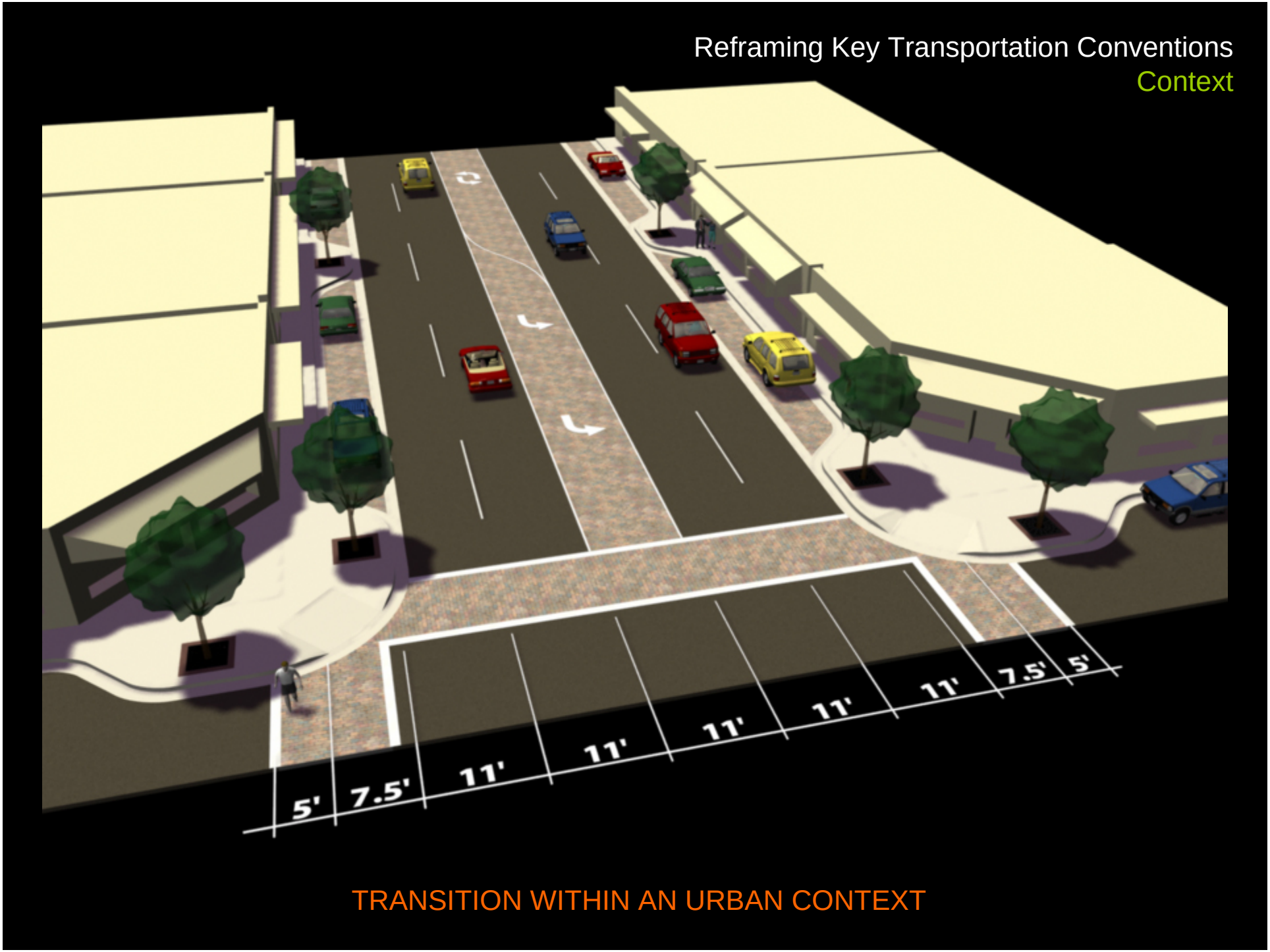
Context



TRANSITION WITHIN AN URBAN CONTEXT

Reframing Key Transportation Conventions

Context



TRANSITION WITHIN AN URBAN CONTEXT

Reframing Key Transportation Conventions

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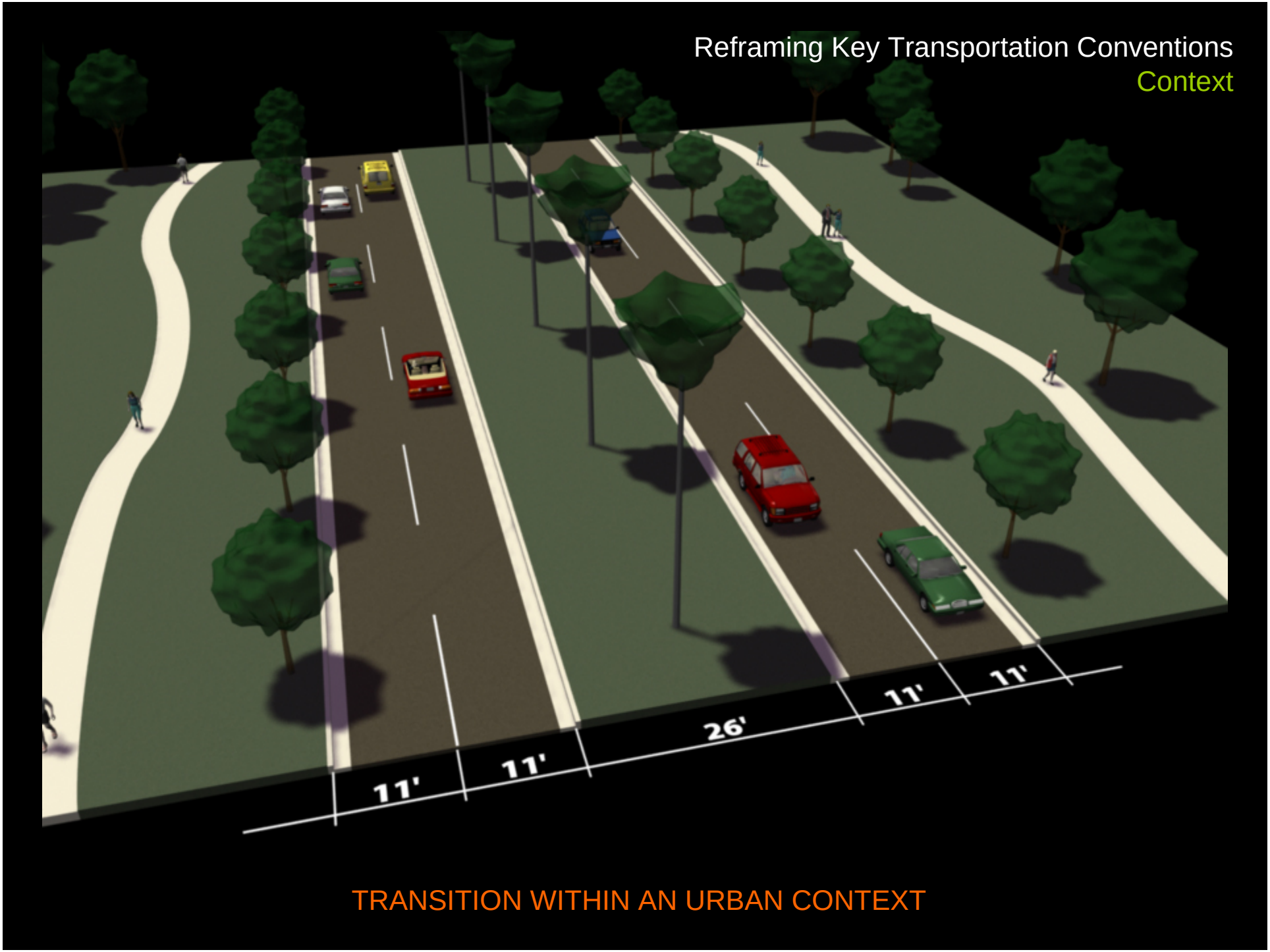

TRANSITION WITHIN AN URBAN CONTEXT

Roadway

Design Controls

Reframing Key Transportation Conventions

DESIGN TRAFFIC

Determine Functional Classification

Hierarchy & Functional Class
Context

then

Establish Design Controls

Design Traffic
- The Role of the Regional Model
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- Role of Micro-Simulation
- Interpreting the Results – Capacity & Travel Time

Design Speed
- Speed / Flow Relationship
- Roadway Safety
- Freight Routes
- Target Speed & Context

then

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Reframing Key Transportation Conventions

DESIGN TRAFFIC – The Role Of The Regional Model

Determine Functional Classification

Hierarchy & Functional Class
Context

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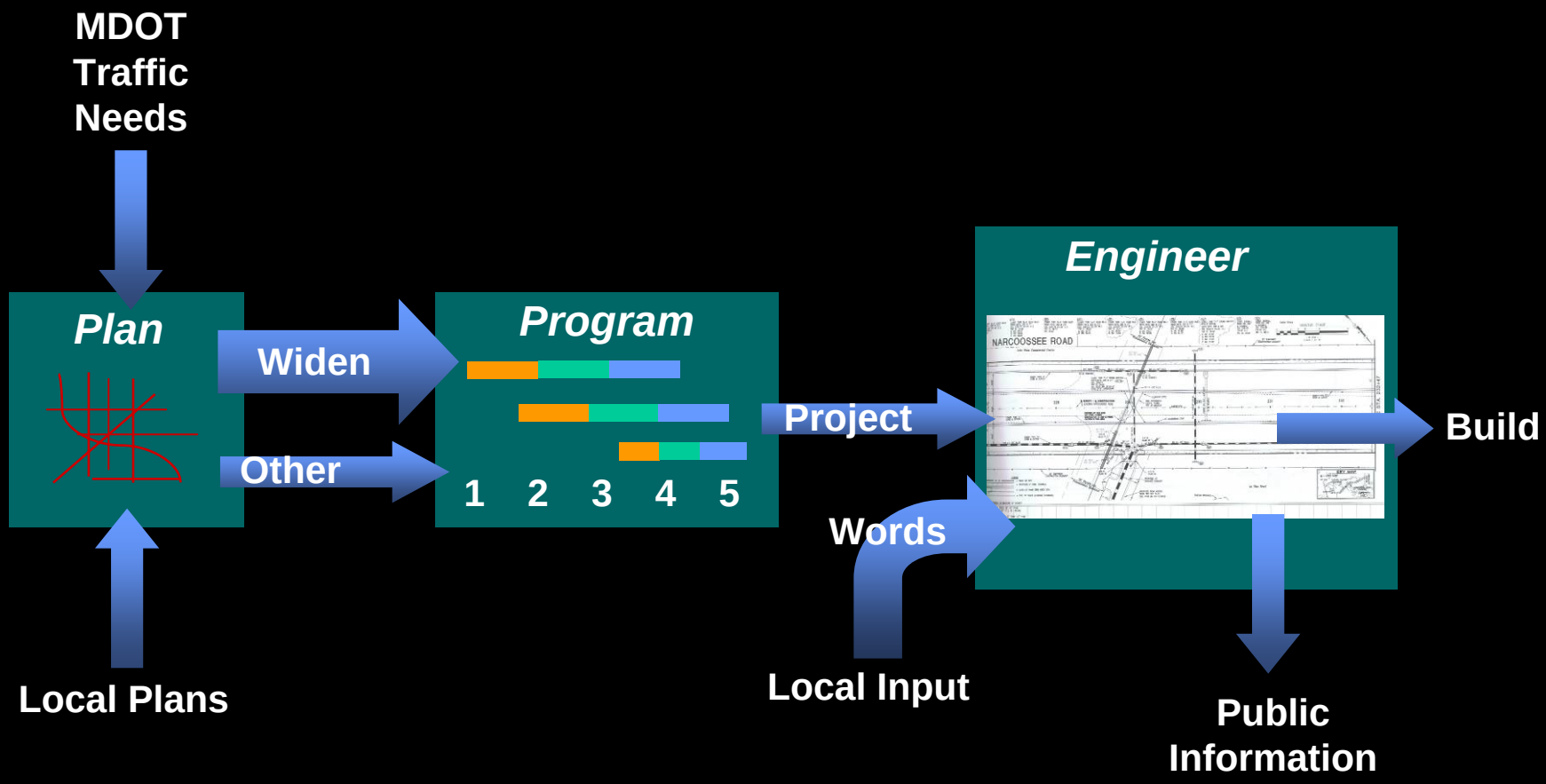
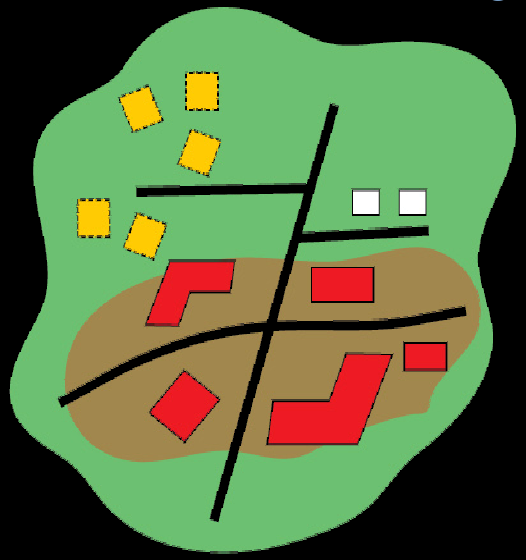
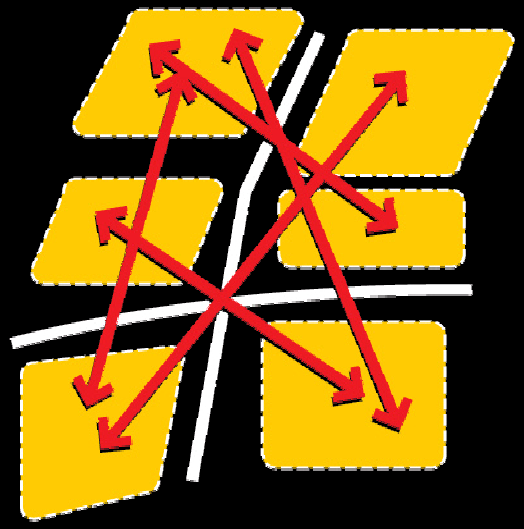
Reframing Key Transportation Conventions

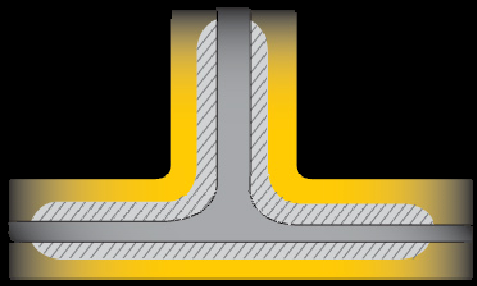
DESIGN TRAFFIC – The Role Of The Regional Model



Land Use **generates** **Travel** **demands** **Road Capacity**







Anticipate

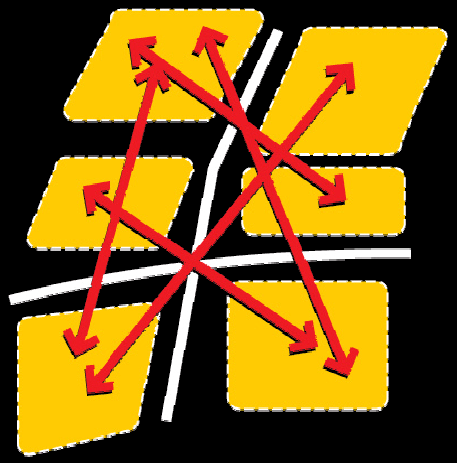
Forecast
(Based on Speed)

Accommodate

Reframing Key Transportation Conventions

DESIGN TRAFFIC – The Role Of The Regional Model

Travel



Forecast
(Based on Speed)

demands

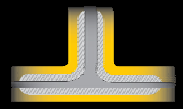
Unconstrained Model Run
(Based on a Limited Regional Network)

Vs.

Constrained Model Run
(Based on a Limited Regional Network)

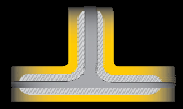
Road Capacity

Desire
(as if nothing else mattered)



Vs.

Need
(Based on Capacity & the Network)



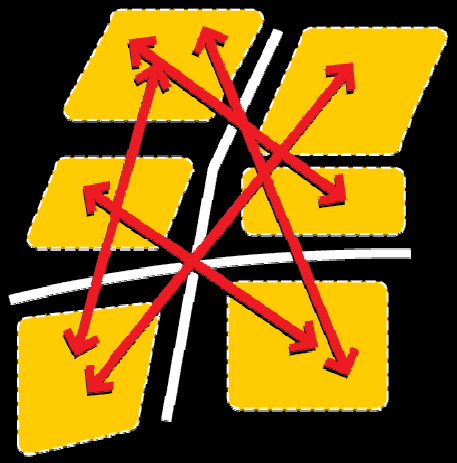
Accommodate

Reframing Key Transportation Conventions
DESIGN TRAFFIC – The Role Of The Regional Model

Travel

demands

Road Capacity



Unconstrained Model Run
(Based on a Limited Regional Network)

Vs.

Constrained Model Run
(Based on a Limited Regional Network)

Desire
(as if nothing else matter)

Vs.

Reality
(Based on Capacity & the Network)

Forecast
(Based on Speed)

Accommodate

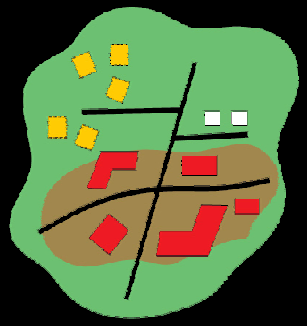
Reframing Key Transportation Conventions

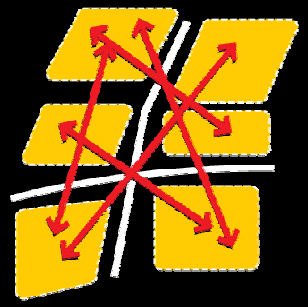
DESIGN TRAFFIC – The Role Of The Regional Model

Land Use

generates

Travel Forecast





Regional Scale

(Based on a Limited Regional Network)

demands

Road Capacity

Region Solution

(as if nothing else mattered)


Can’t Be Improved Further
QUALITY USED CARS
COUNTRY KITCHEN

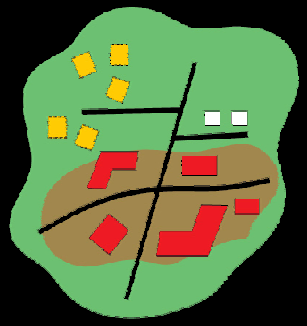
Reframing Key Transportation Conventions

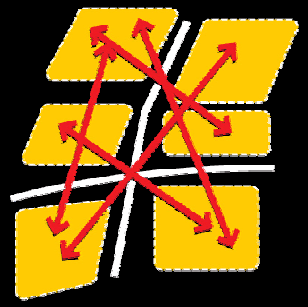
DESIGN TRAFFIC – The Role Of The Regional Model

Land Use

generates

Travel Forecast





demands

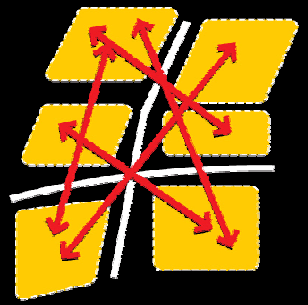
Road Capacity

Order of Magnitude

Regional Scale

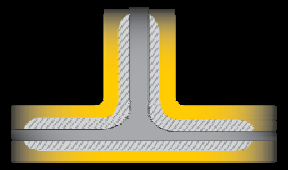
(Based on a Limited Regional Network)

Informs



Corridor Scale

(Based on Expanded Corridor Network)



Corridor Based Solution

Reframing Key Transportation Conventions

DESIGN TRAFFIC - Understanding Travel Patterns

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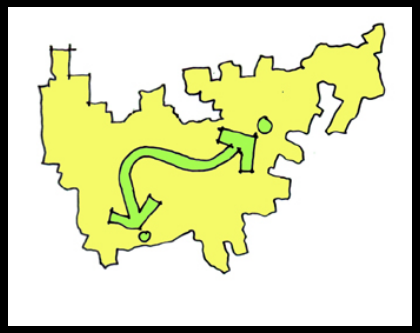
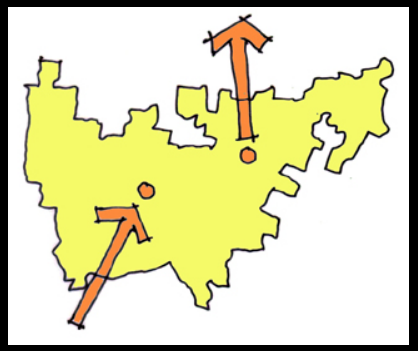
Reframing Key Transportation Conventions

DESIGN TRAFFIC - Understanding Travel Patterns

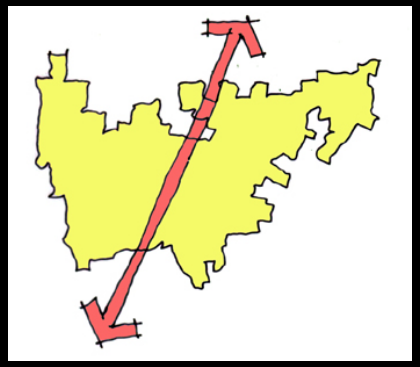


- Internal Travel – Preserve the capacity and quality of local streets for travel made entirely within the City.



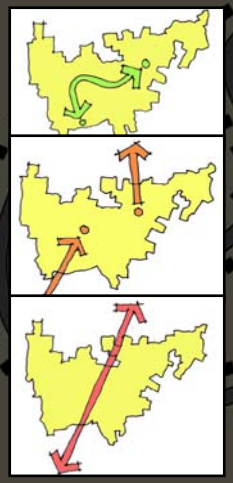
- Local Travel – Make selective, precisely targeted capacity improvements, on the City's own terms. for trips beginning in (by residents of) Roswell and trips ending in (by visitors to) Roswell.

SELECT LINK ANALYSIS



- Through Travel – For regional through trips - neither beginning nor ending in the City.

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Understanding Travel Patterns



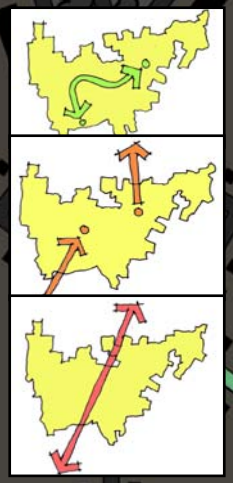
Local Trips within the Corridor 7%

Trips That Start or End in Corridor 52%

Through Trips Corridor 41%

Reframing Key Transportation Conventions

DESIGN TRAFFIC - Understanding Travel Patterns



Local Trips within the Corridor 7%

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Reframing Key Transportation Conventions

DESIGN TRAFFIC – Vehicle Types

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Hierarchy & Functional Class

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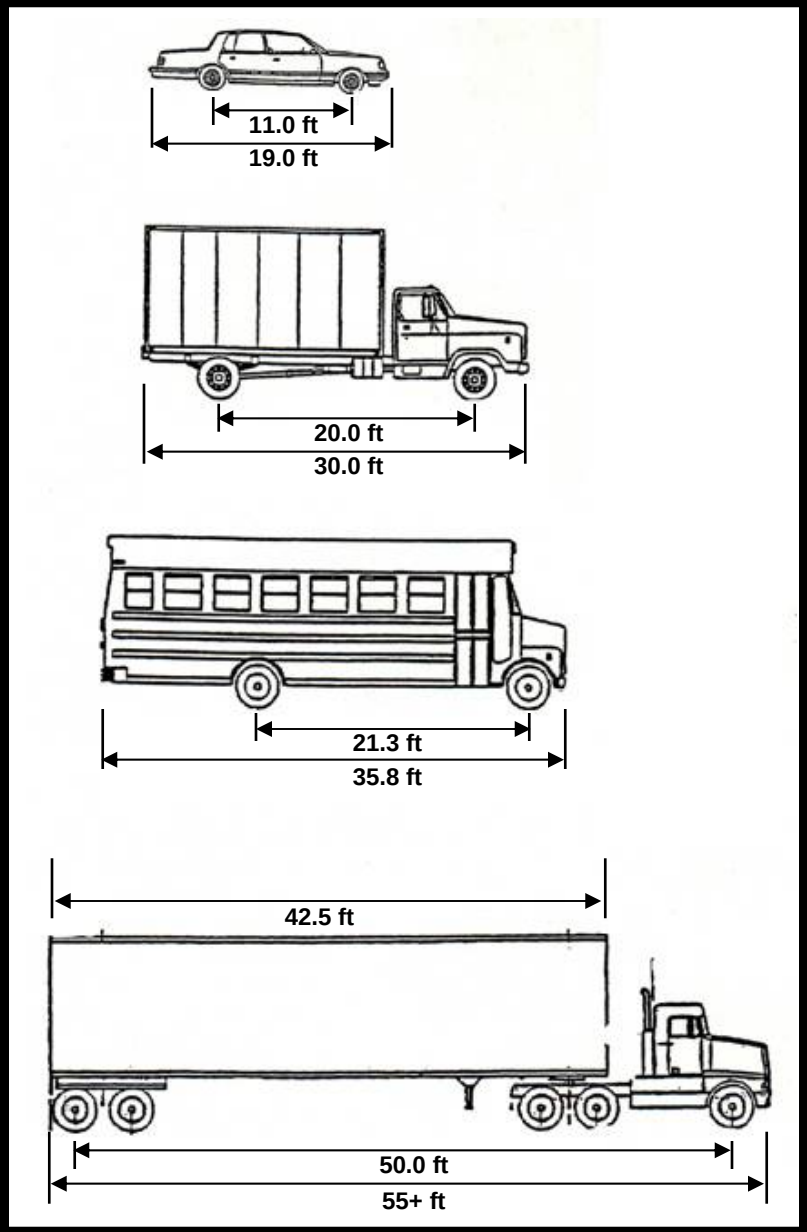
Reframing Key Transportation Conventions
DESIGN TRAFFIC - Vehicle Types

Design Vehicles

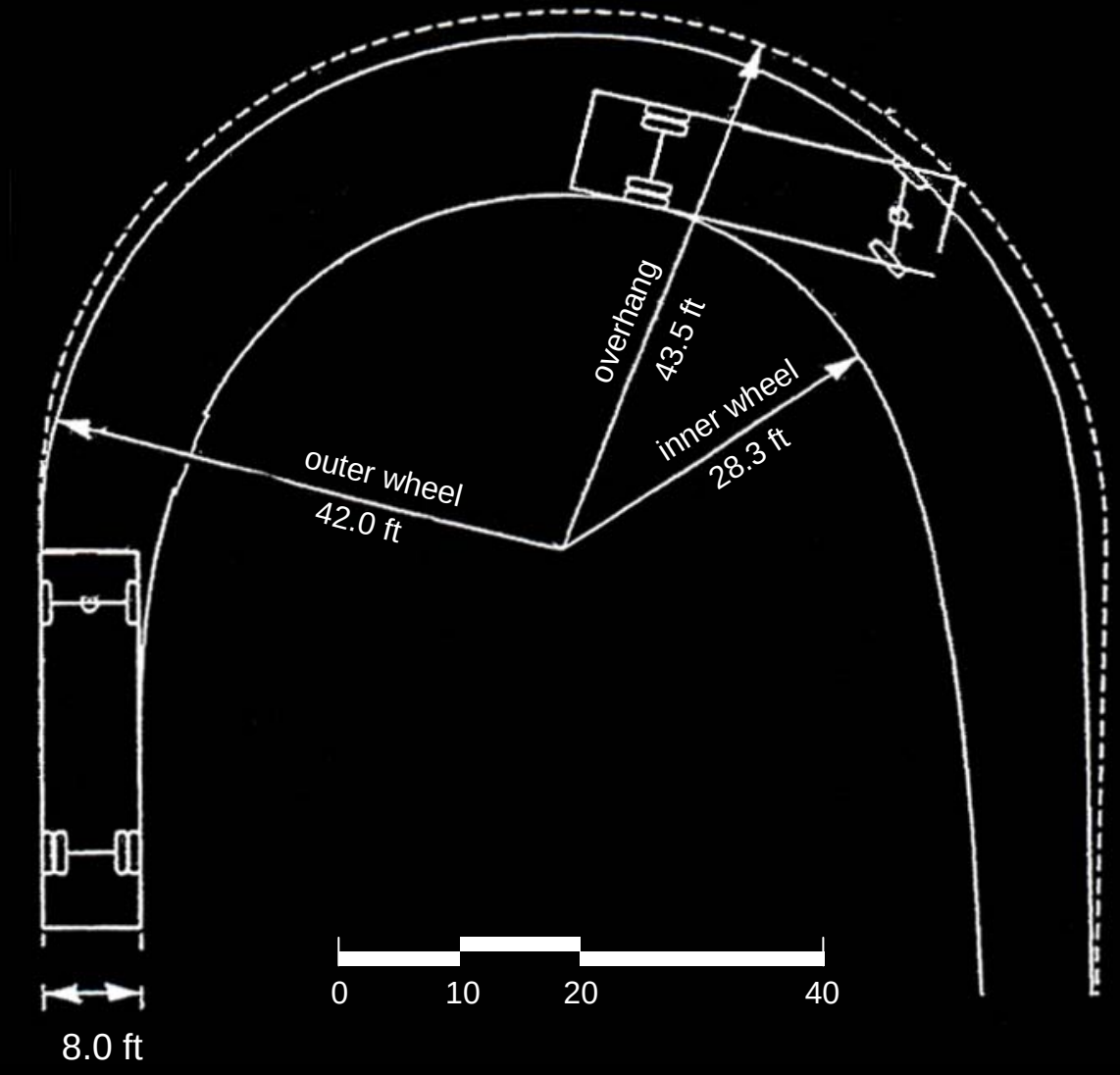


Reframing Key Transportation Conventions
DESIGN TRAFFIC – Vehicle Types

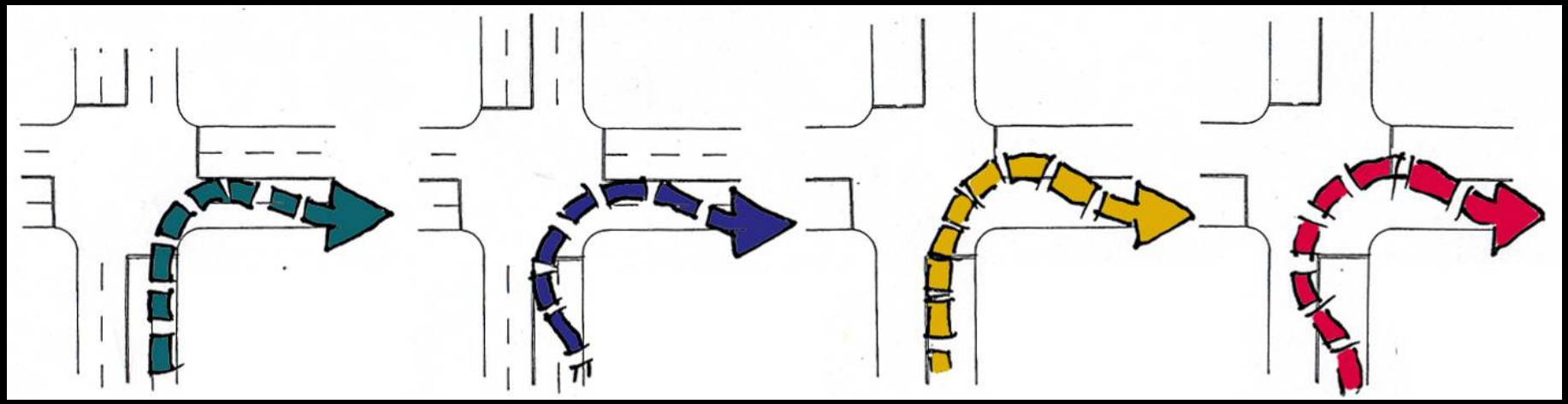
Street Classification	Passenger Car "P"	Single Unit Truck "SU-30"	Tractor-Trailer "WB-50"
Arterial		●	●
Collector	●	●	
Local	●		

Design Vehicle

Single Unit ("SU") Truck Turning Radius



Types of Encroachment



#1: Use full departure leg

#2: Use full approach and departure leg

#3: Encroach across departure centerline

#4: Encroach across departure and departure centerline

To (Departure Street)

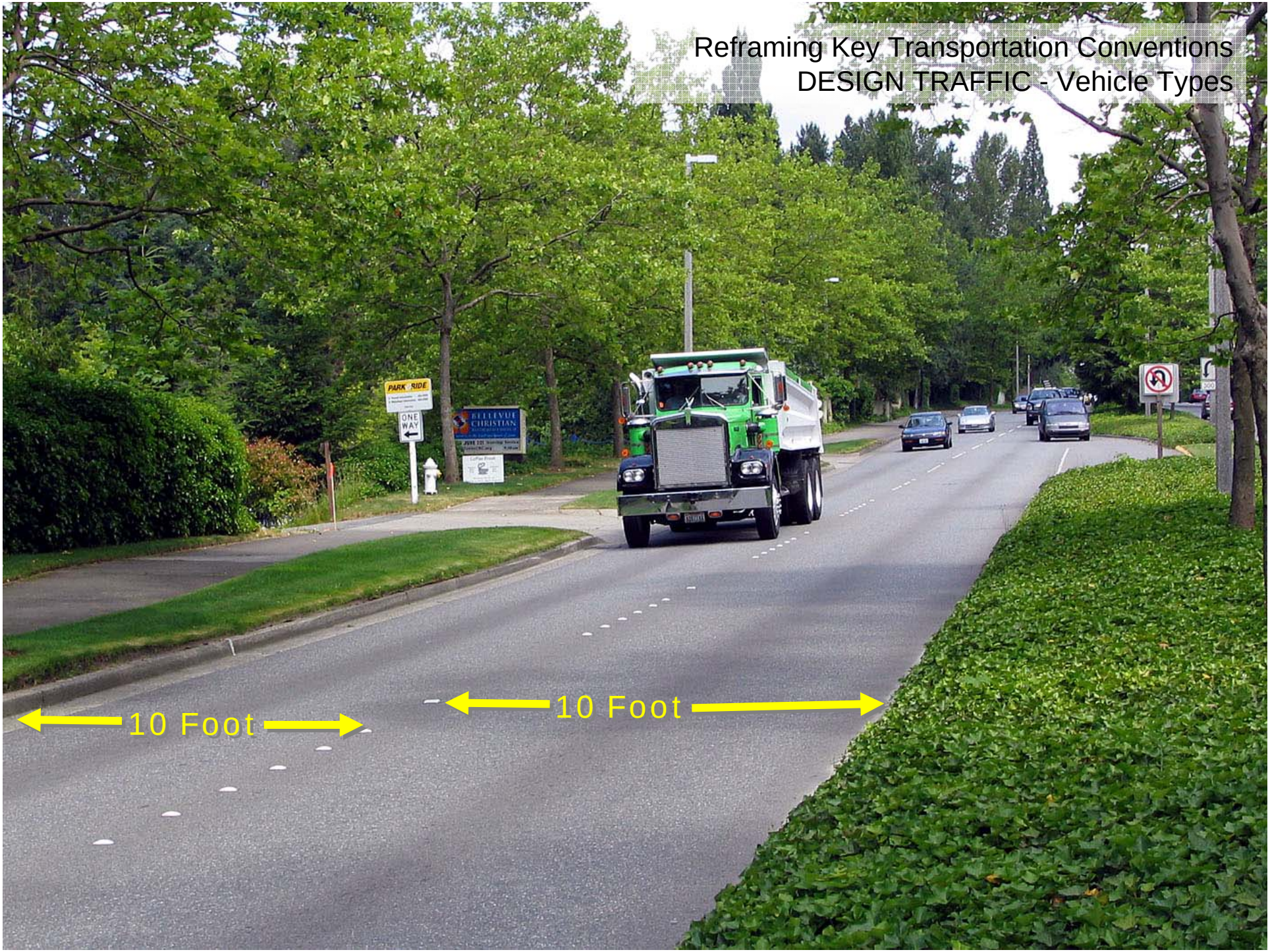
From (Approach Street)	Art	Col	Loc
Arterial (Art)	1	2	3
Collector (Col)	2	3	4
Local (Loc)	2	4	4

Permissible Encroachments

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Vehicle Types

% Truck Traffic

Influences Roadway Geometrics & Design Speed


Reframing Key Transportation Conventions
DESIGN TRAFFIC - Vehicle Types
PARK SIDE
ONE WAY
BELLEVUE CHRISTIAN
10 Foot
10 Foot

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Defining the Context

Determine Functional Classification

Hierarchy & Functional Class
Context

then

Establish Design Controls

Design Traffic
- The Role of the Regional Model
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- Vehicle Types
- Defining the Context - Network and Mode Choice
- Role of Micro-Simulation
- Interpreting the Results – Capacity & Travel Time

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- Speed / Flow Relationship
- Roadway Safety
- Freight Routes
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- Geometric (Sight Distance / Stopping Distance)
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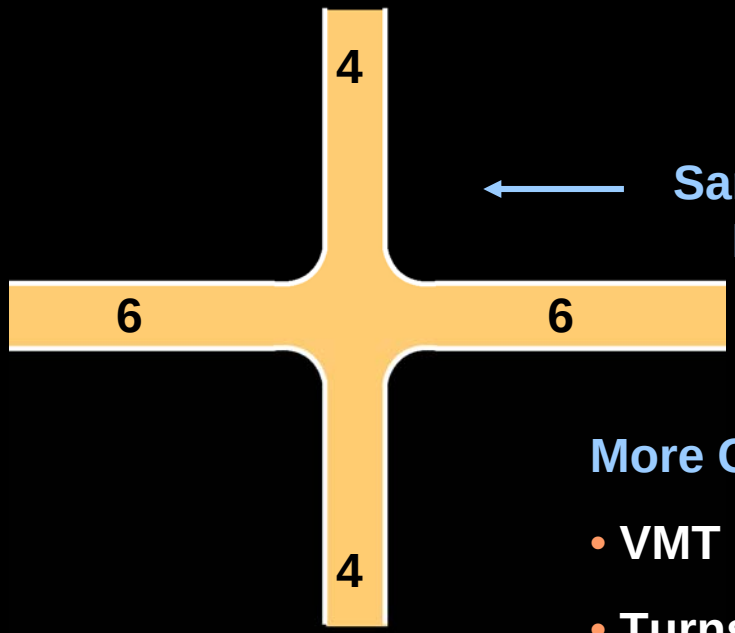
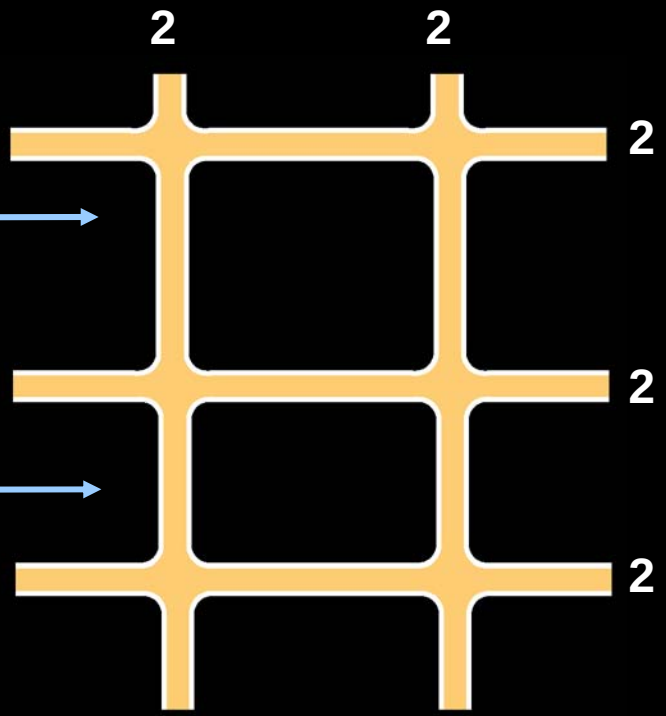
- Design Variances and Exceptions

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Defining the Context



Same Total Lanes



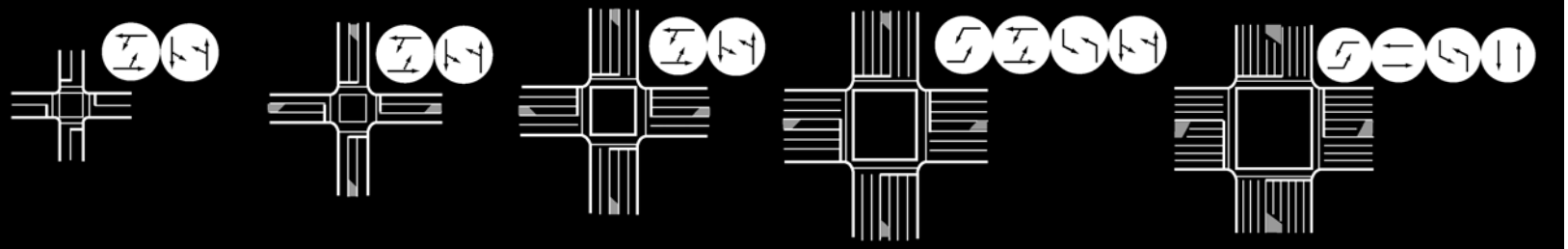
More Capacity

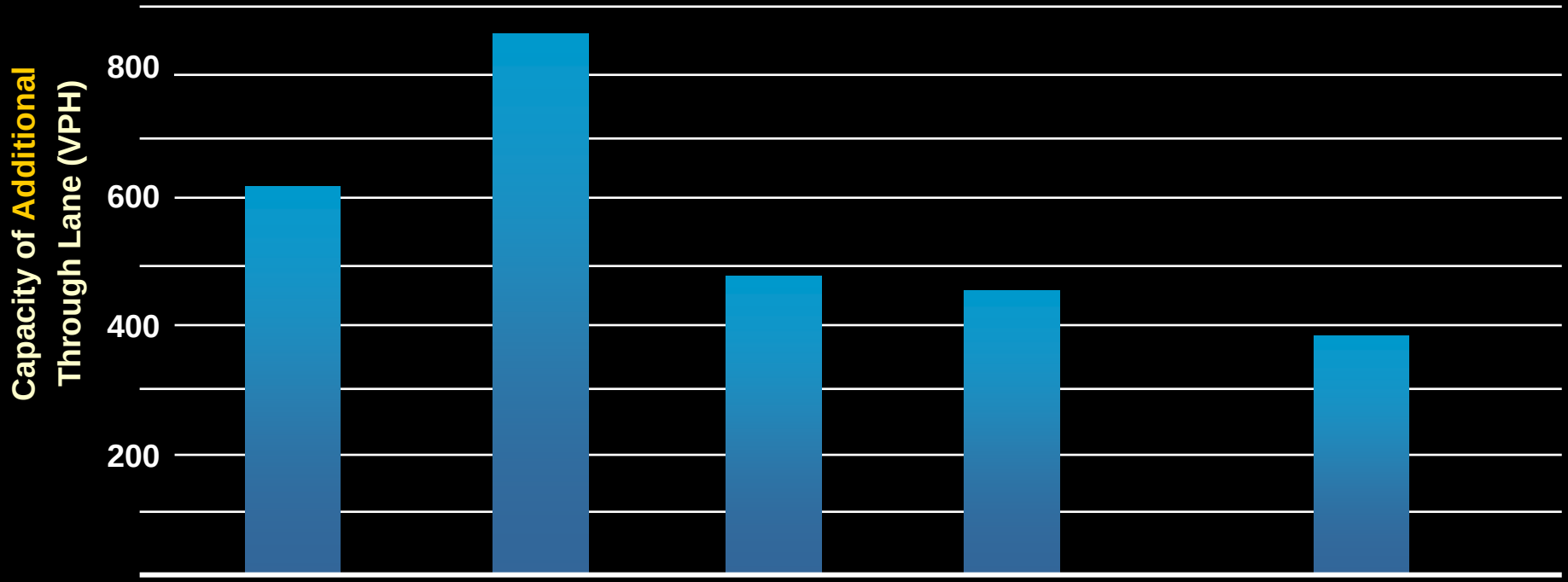
- VMT
- Turns
- Clearance Time
- Signal Phase

Benefits of Network

Reframing Key Transportation Conventions

DESIGN TRAFFIC - Defining the Context





Lane Capacity

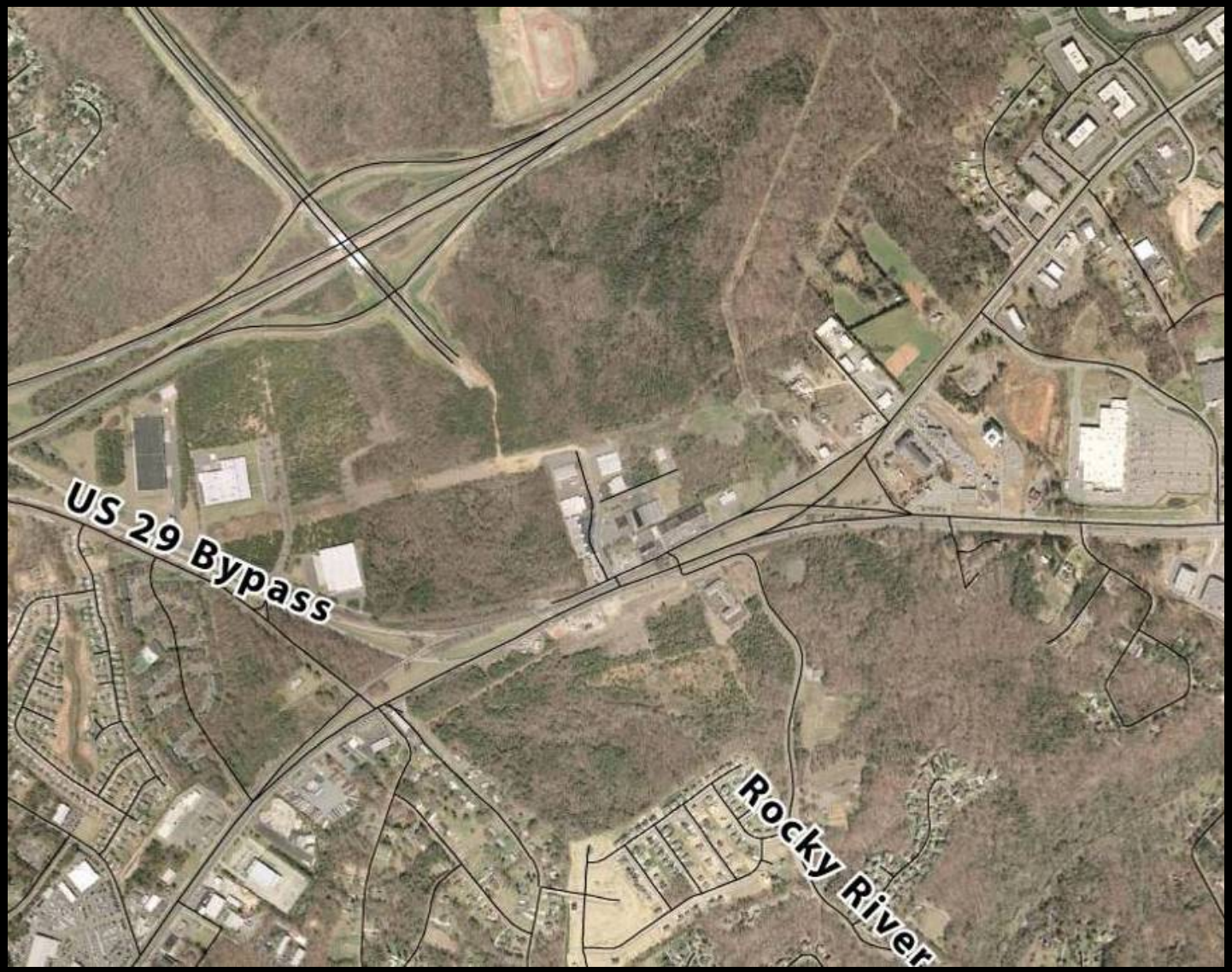
Reframing Key Transportation Conventions
DESIGN TRAFFIC - Defining the Context

Inside the R-O-W

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Defining the Context

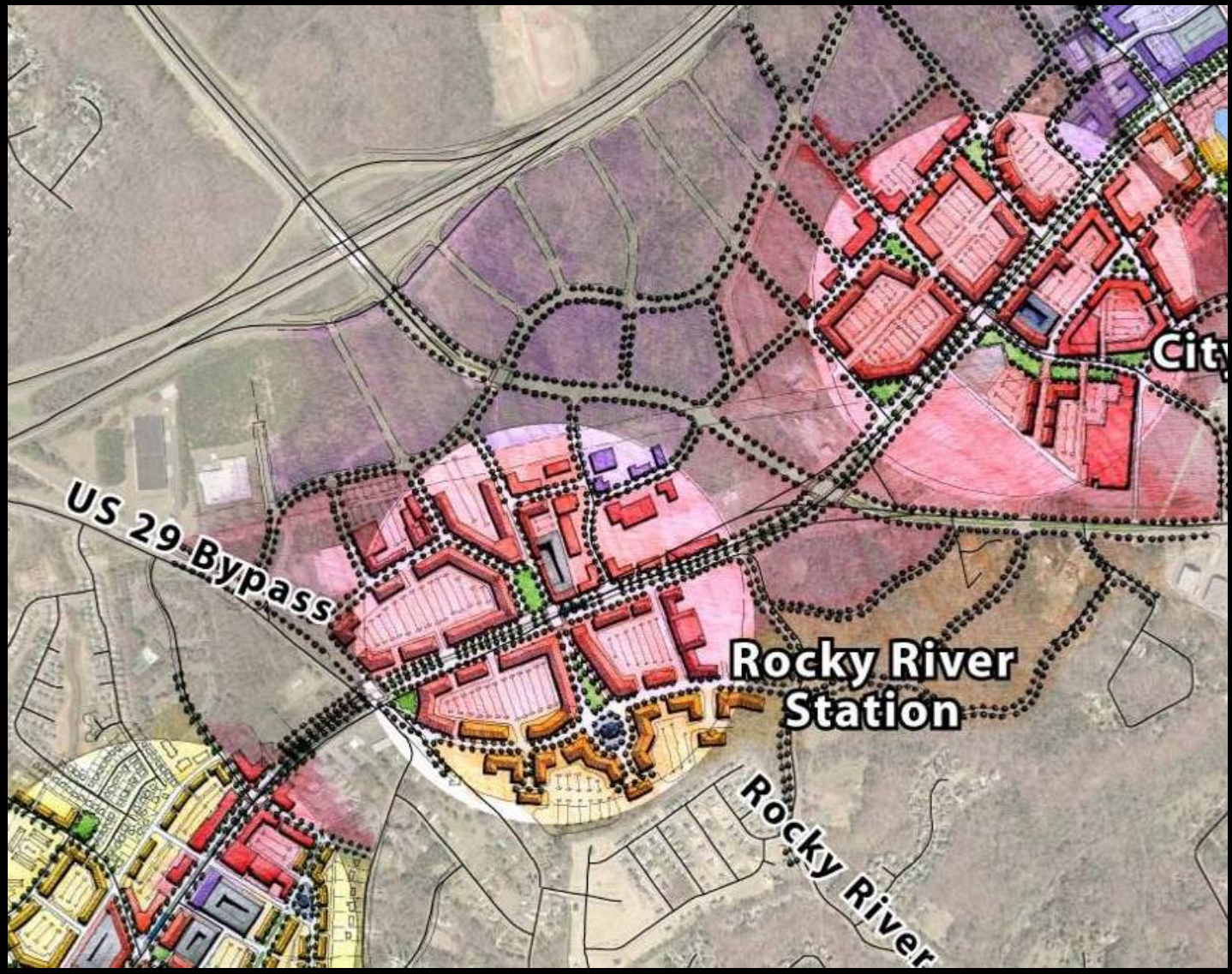
Adjacent Network

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Defining the Context



Inside the R-O-W

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Defining the Context



Future Desired Network

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Micro-Simulation

Determine Functional Classification

Hierarchy & Functional Class
Context

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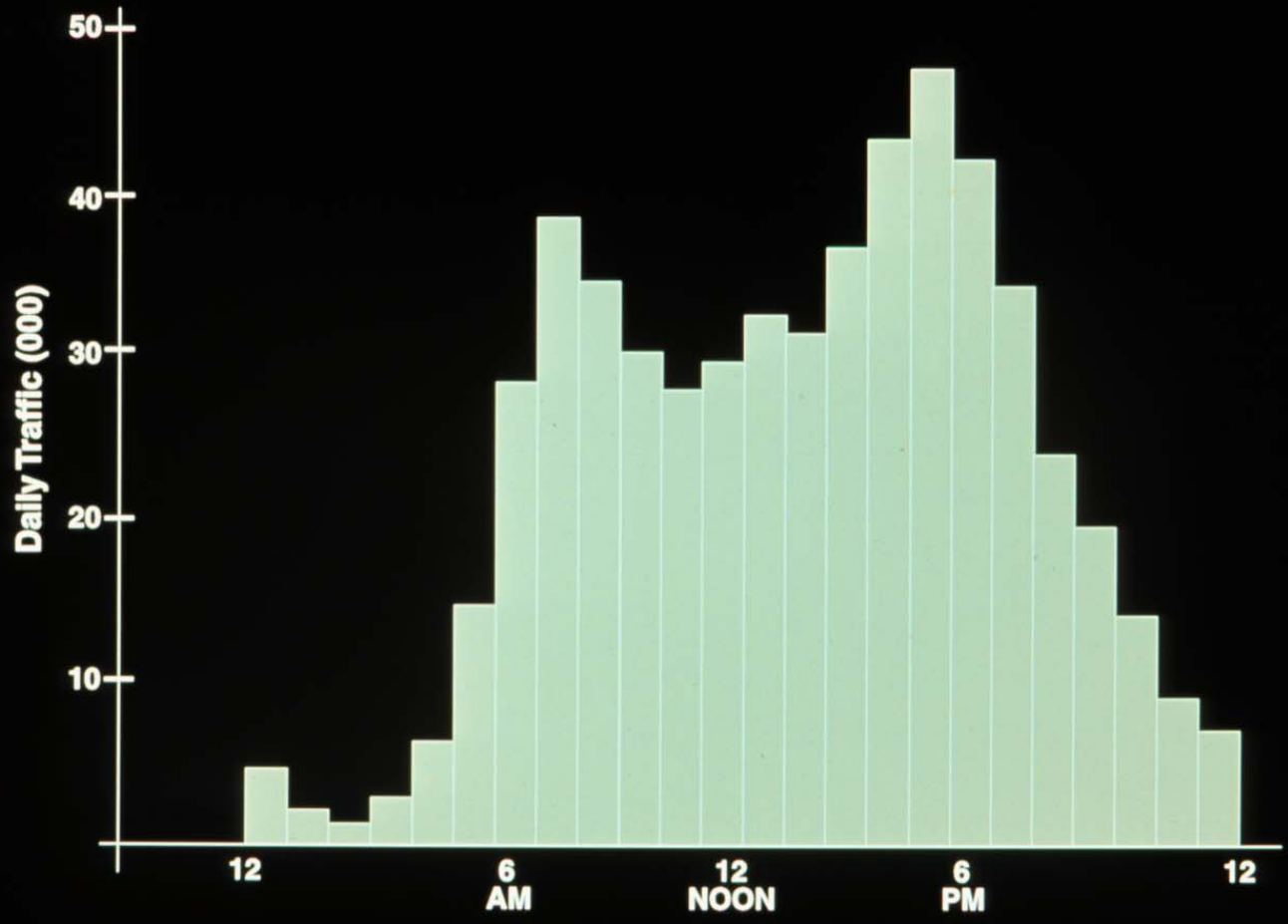
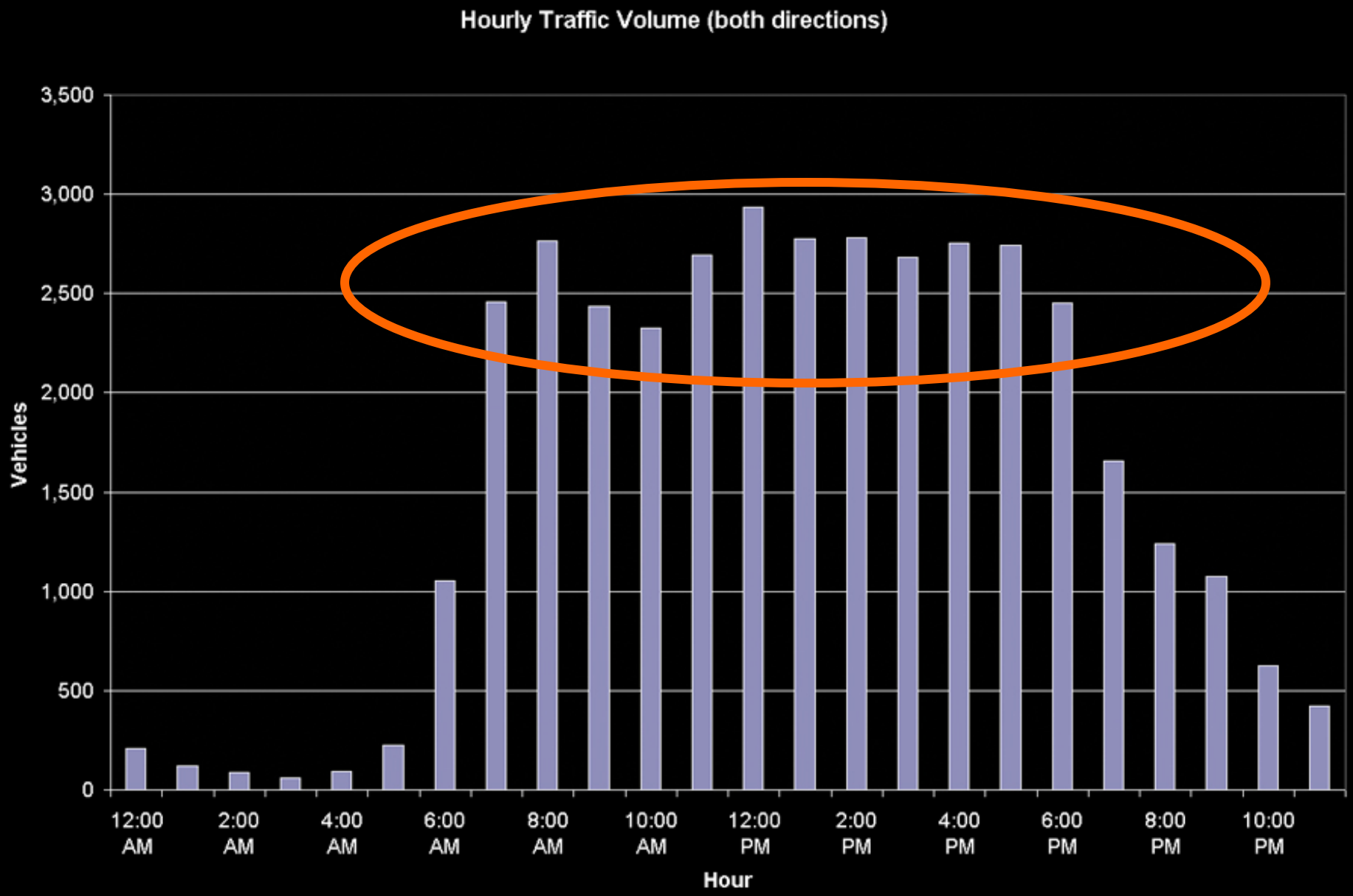


Suburban Travel Distribution

Land Use Solution

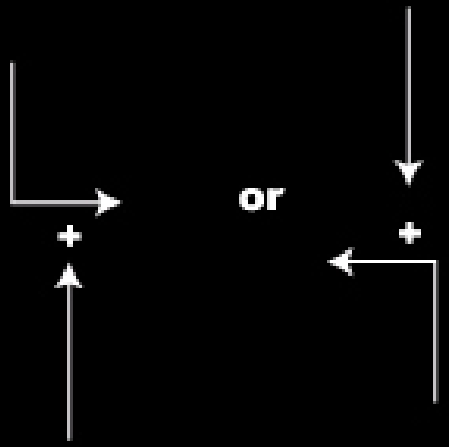
Urban Travel Distribution



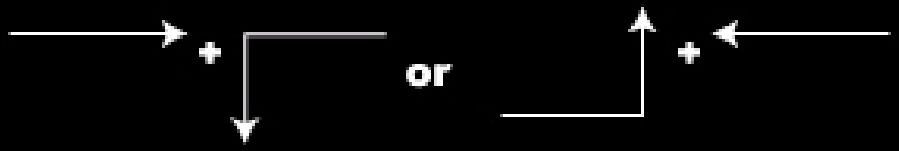
Alternative Mode Solution

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Micro-Simulation

N-S CLV

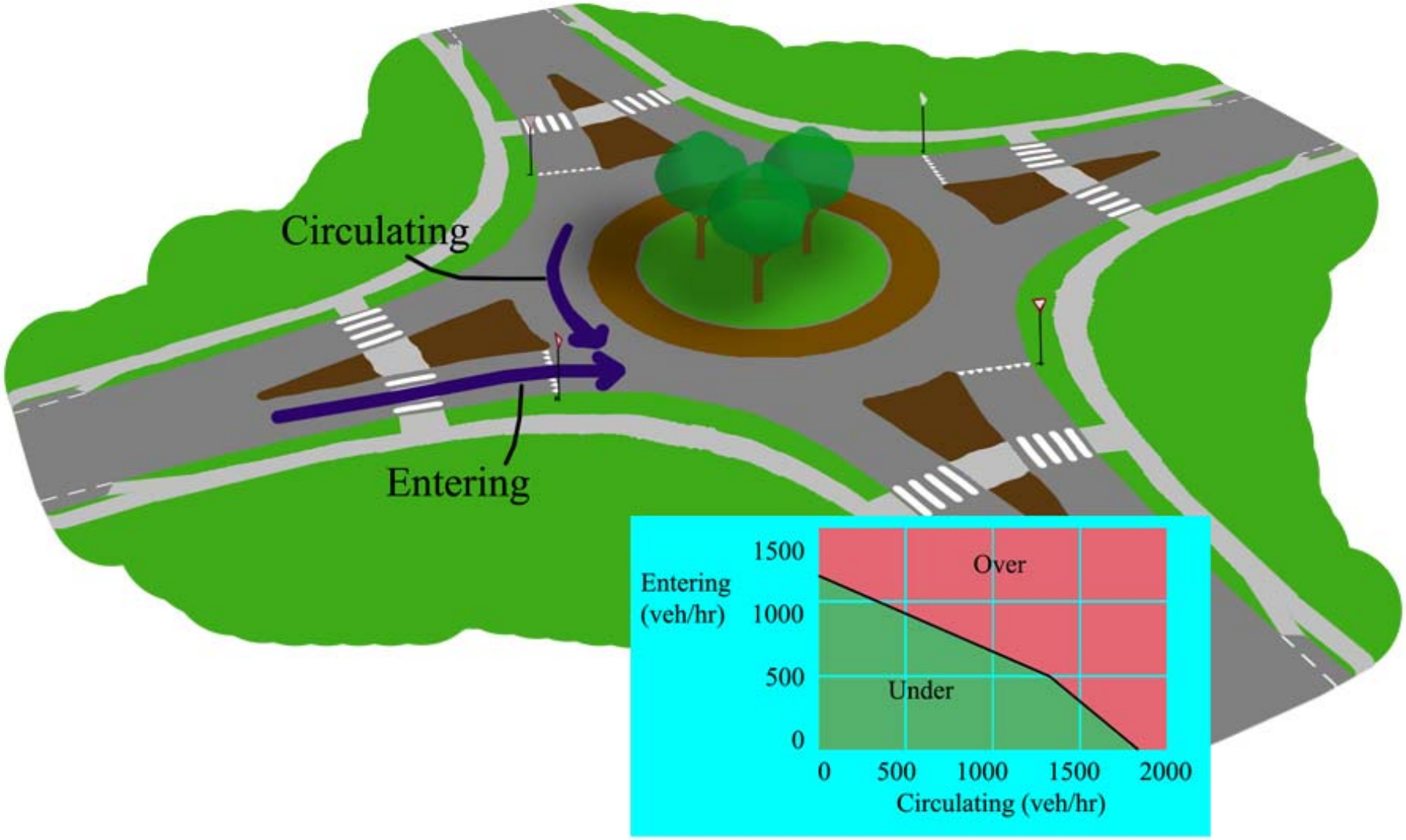


E-W CLV

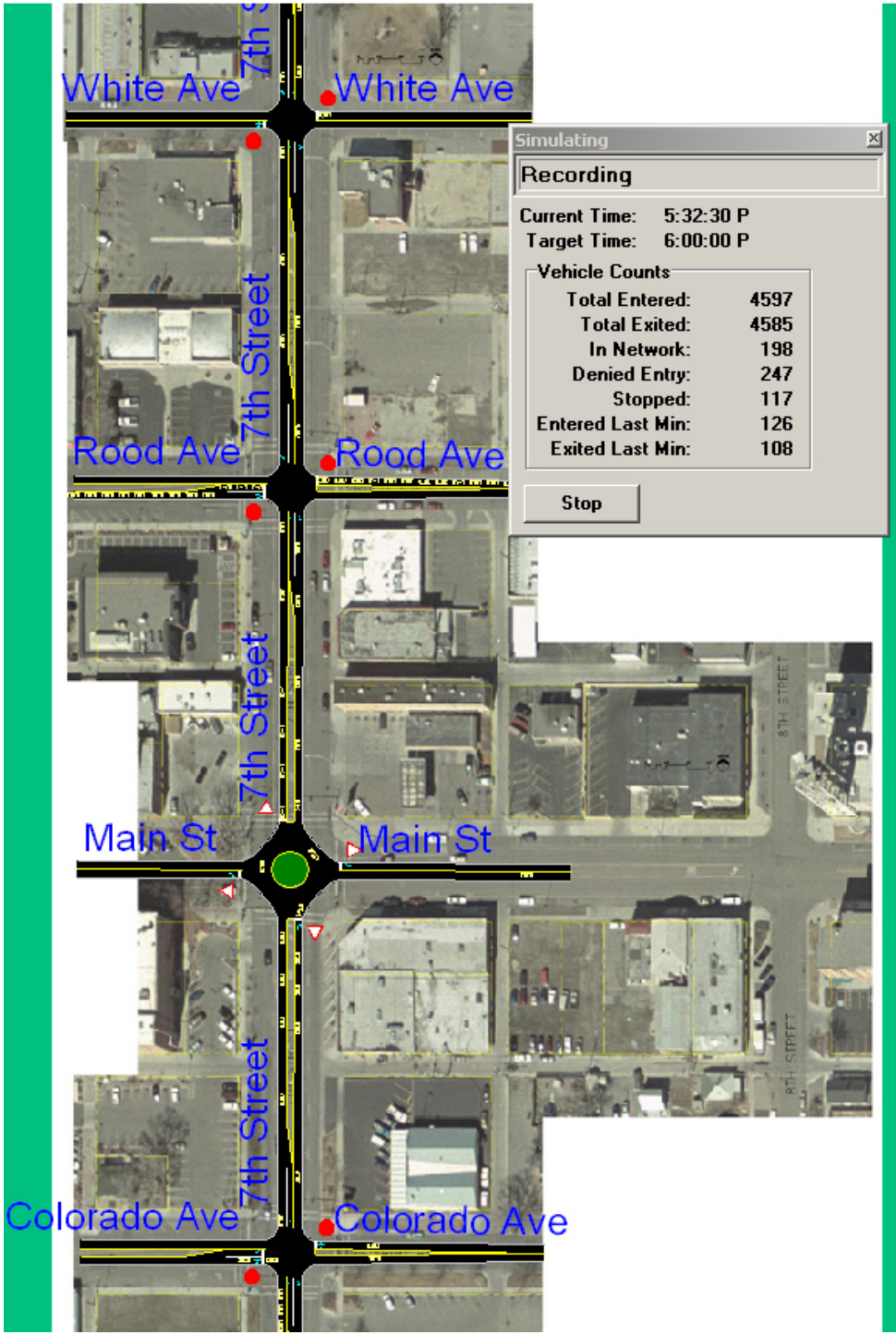


Total CLV:

Less than 900 free flow
900-1200 normal midday
1200-1400 typical peak hour
1400-1500 near saturation
Over 1500 loaded cycles


Circulating
Entering
Entering (veh/hr)
1500
1000
500
0
Over
Under
0
500
1000
1500
2000
Circulating (veh/hr)

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Micro-Simulation



Reframing Key Transportation Conventions

DESIGN TRAFFIC - Interpreting the Results

Determine Functional Classification

Hierarchy & Functional Class

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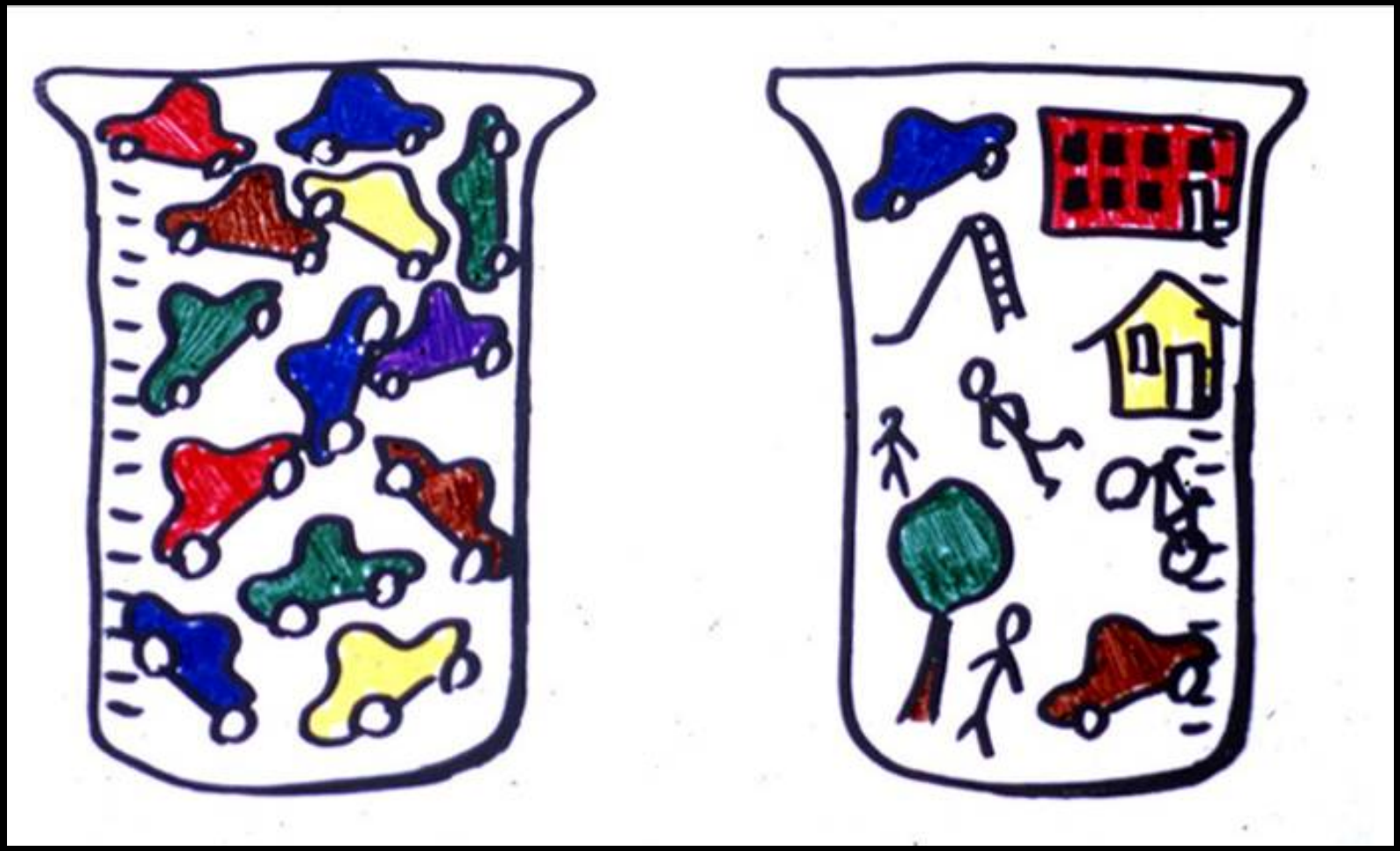
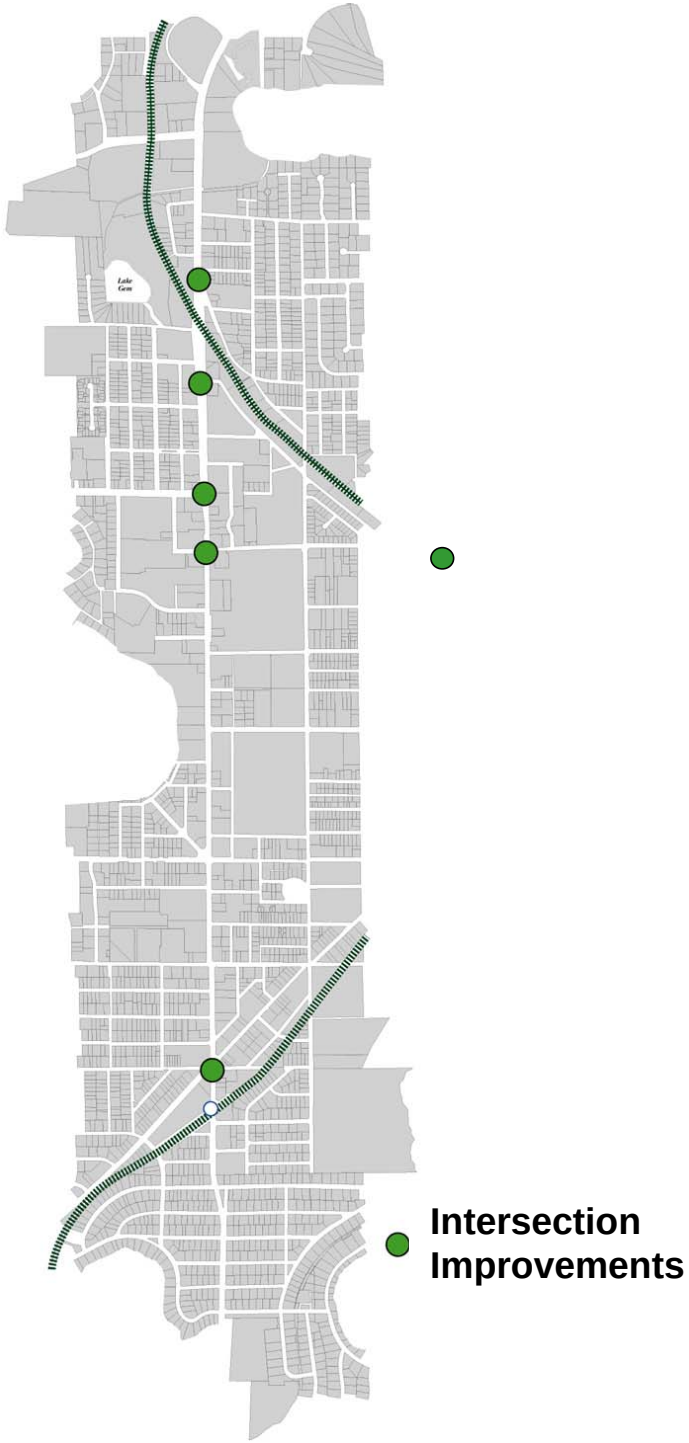


Capacity of Streets

LEVEL OF SERVICE DEFINITIONS

SERVICE

LEVEL	DEFINITION – Operating Speed
A	Free Flow: Users unaffected by others in the traffic stream.
B	Stable Flow: Slight decline in the freedom to maneuver from LOS “A”
C	Stable Flow: Operation of the vehicle becomes significantly affected by the interaction of others in the traffic system.
D	Approaching Unstable Flow: High volumes of traffic, speeds adversely affected, and the freedom to maneuver is severely restricted.
E	Unstable Flow: Operating conditions are at, or very near capacity. All speeds are low and the freedom to maneuver is extremely difficult.
F	Exceeding Capacity: Point at which arrival flows exceed discharge flows causing queuing delays. Stoppages may occur for long periods of time because of the downstream congestion. Travel times are also substantially increased.



Reframing Key Transportation Conventions
DESIGN TRAFFIC - Interpreting the Results

Intersections Improved

- Orlando/Park
- Orlando/Solana
- Orlando/Lee
- Orlando/Webster
- Orlando/Orange
- Denning/Webster

Overall Increase in Mobility

Northbound

From 5.3 mph to 5.7 mph

95 seconds saved over the corridor

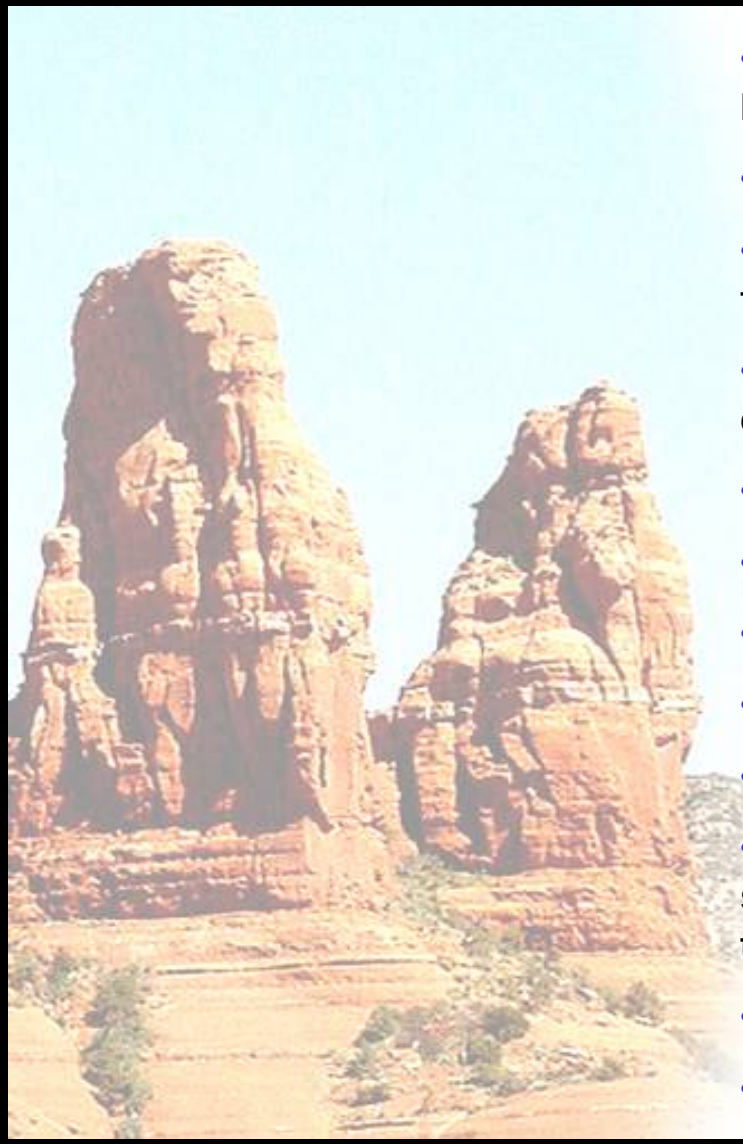
Southbound

From 8.1 mph to 9.1 mph

98 seconds saved over the corridor

Summary Table

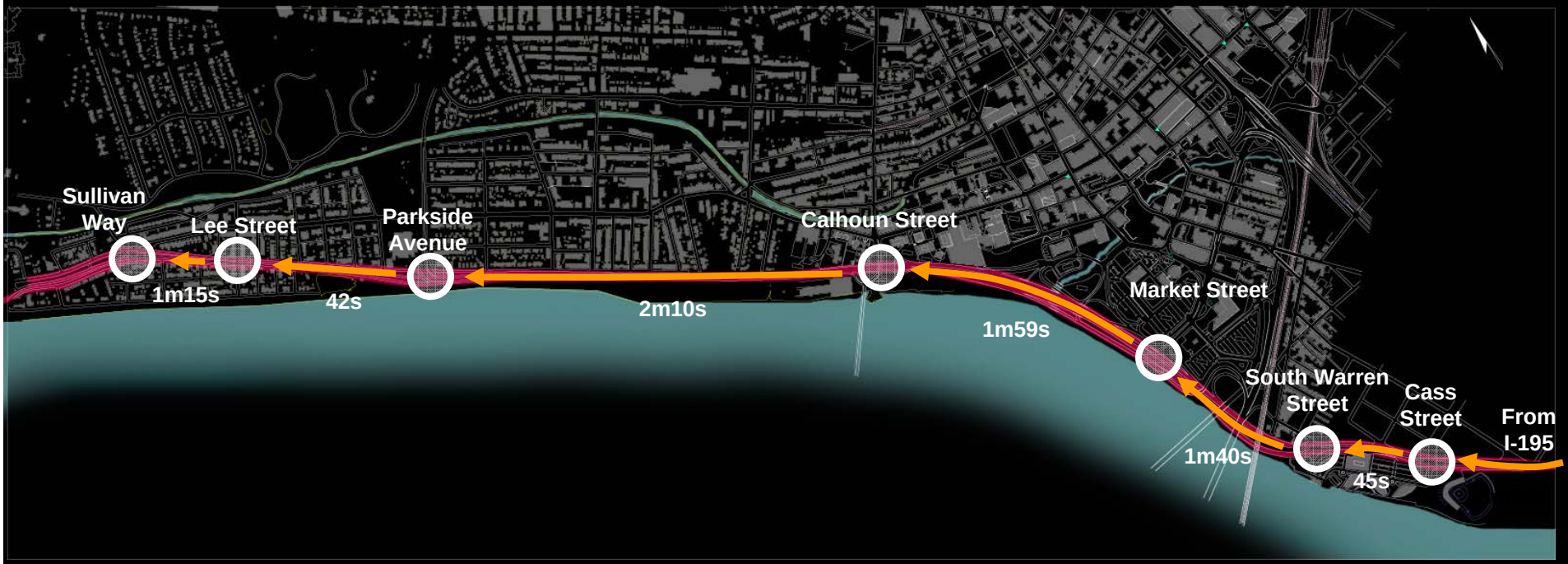
		Existing	4 Way @ Holden	4 Way @ Gatlin	Town Square	Quadrant
Traffic	Intersection Level of Service (LOS)	D E (Very Poor)	E (Poor)	E (Poor)	B B (Very Good)	C A (Very Good)
	Orange Avenue Capacity	100% (Poor)	(Fair)	(Fair)	(Very Good)	(Very Good)
	Holden / Gatlin Movement	Fair	Very Good	Very Good	Fair	Fair
	Pedestrians	Very Poor	Poor	Poor	Very Good	Very Good
	Safety	Very Poor	Good	Good	fair	Very Good
Urban Design	Gateway, Town Center	Poor	Very Poor	Very Good	Very Good	Very Good
	New Frontage	Poor	Good	Good	Very Good	Very Good
	West Property Access	Poor	Fair	Very Good	Fair	Good
	East	Good	Good	Fair	Poor	Fair



- **Retain and enhance the natural appearance of the landscape**
- **Provide a distinctive corridor identity**
- **Provide safe vehicular and emergency access to, from and across the corridor**
- **Provide safe bicycle and pedestrian crossings and circulation**
- **Minimize noise impacts in a context-sensitive mann**
- **Provide accommodation for wildlife**
- **Minimize light pollution of the night sky**
- **Minimize right-of-way requirements**
- **Minimize air quality impacts**
- **Provide motorists with a reliable transportation system and reasonably predictable travel times, with the constraints of the external network**
- **Accommodate a public transportation system**
- **Constructability**

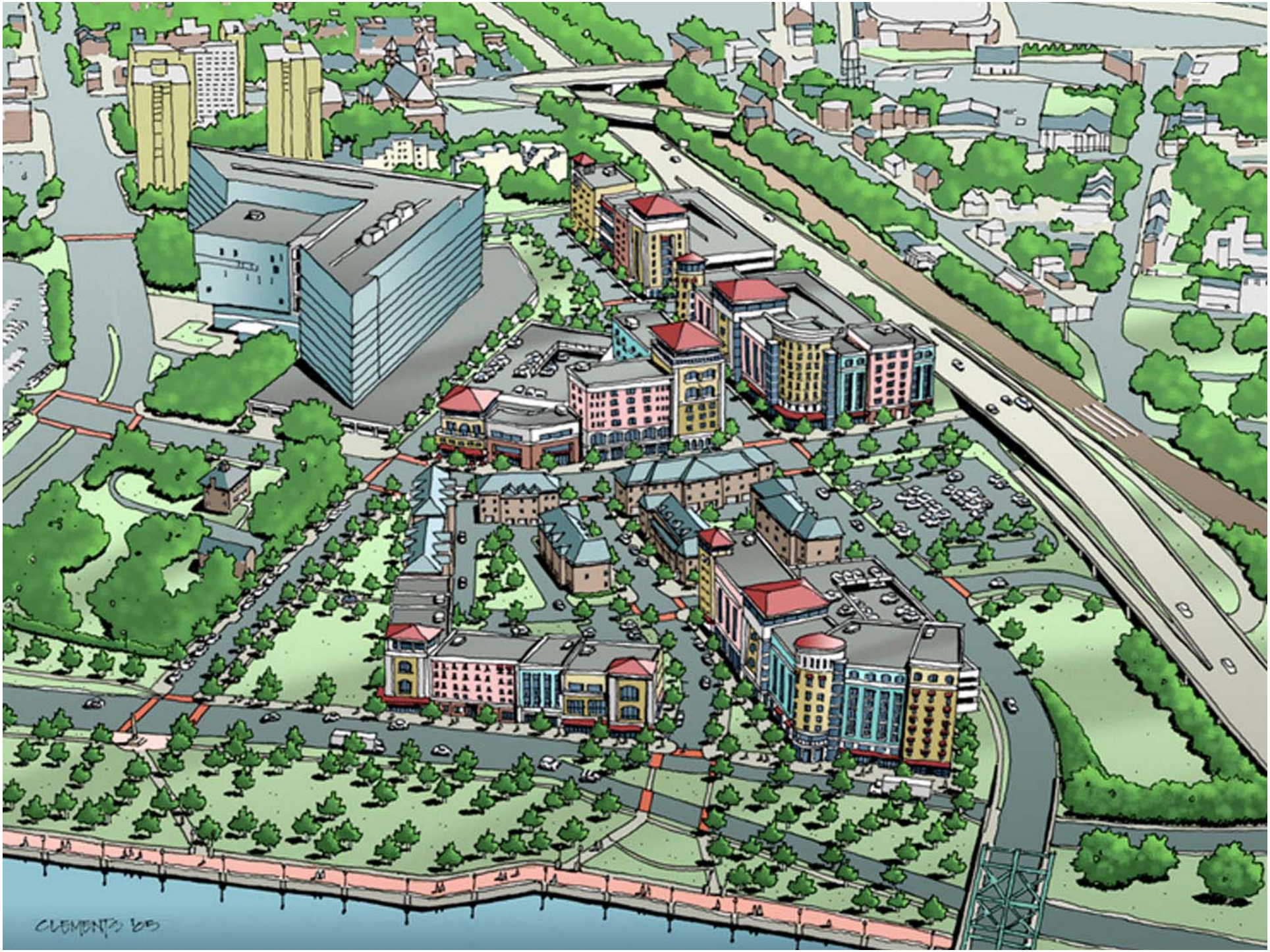
Evaluation Criteria

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Interpreting the Results

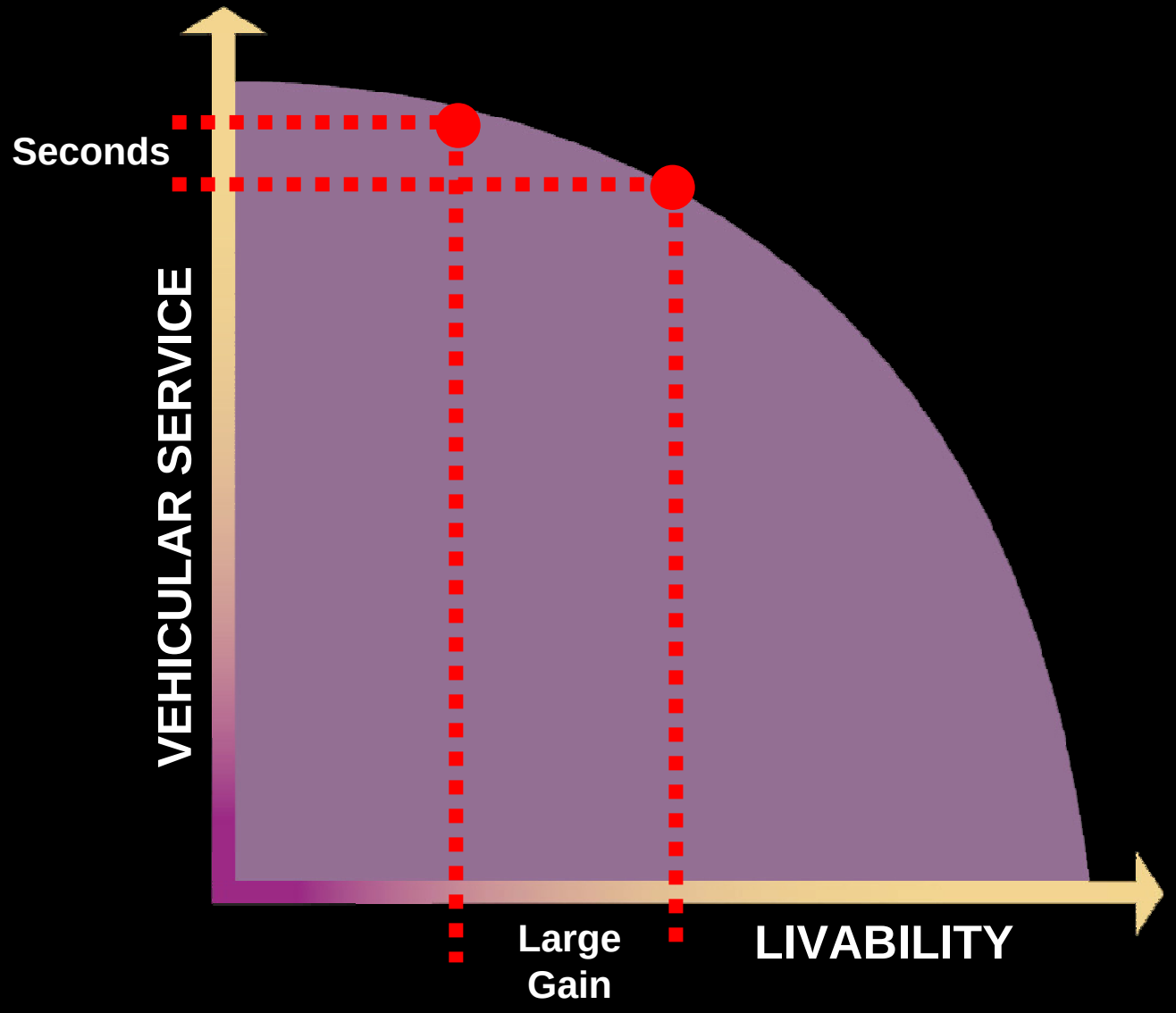


Total Travel Time of Route 29 NB Corridor = 21m57s

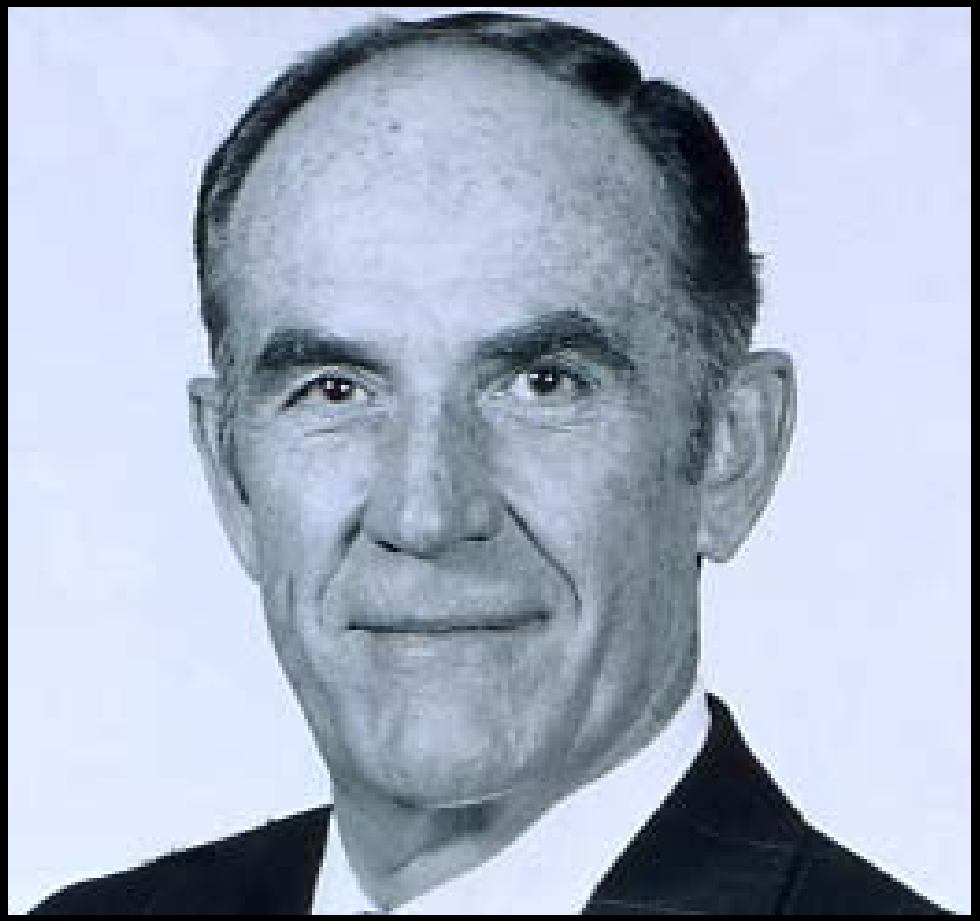
Difference Between Existing and Proposed = 2m01s


CLEMENTS '05

Reframing Key Transportation Conventions
DESIGN TRAFFIC - Interpreting the Results



“Highway design is too important to be left to Highway Engineers.”



Dr. Thomas D. Larson
Federal Highway Administration

Reframing Key Transportation Conventions
DESIGN SPEED

Determine Functional Classification

Hierarchy & Functional Class
Context

then

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- Target Speed & Context
- Minimums vs. Maximums
- Speed & Roadway Geometrics

then

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Reframing Key Transportation Conventions
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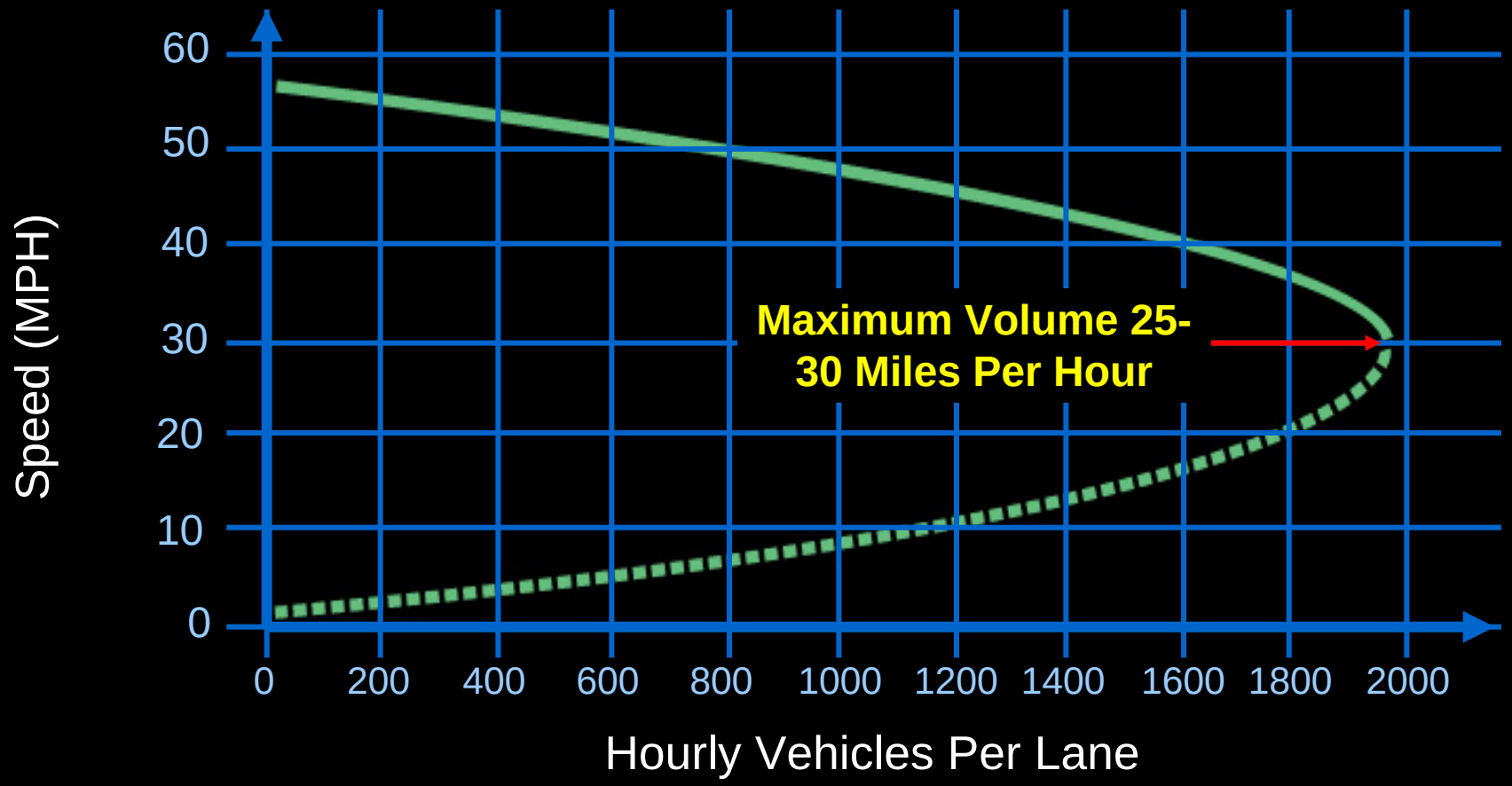
Reframing Key Transportation Conventions

DESIGN SPEED - Speed / Flow Relationship



Free flow Condition

Reframing Key Transportation Conventions
DESIGN SPEED - Roadway Safety

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Reframing Key Transportation Conventions
DESIGN SPEED - Roadway Safety

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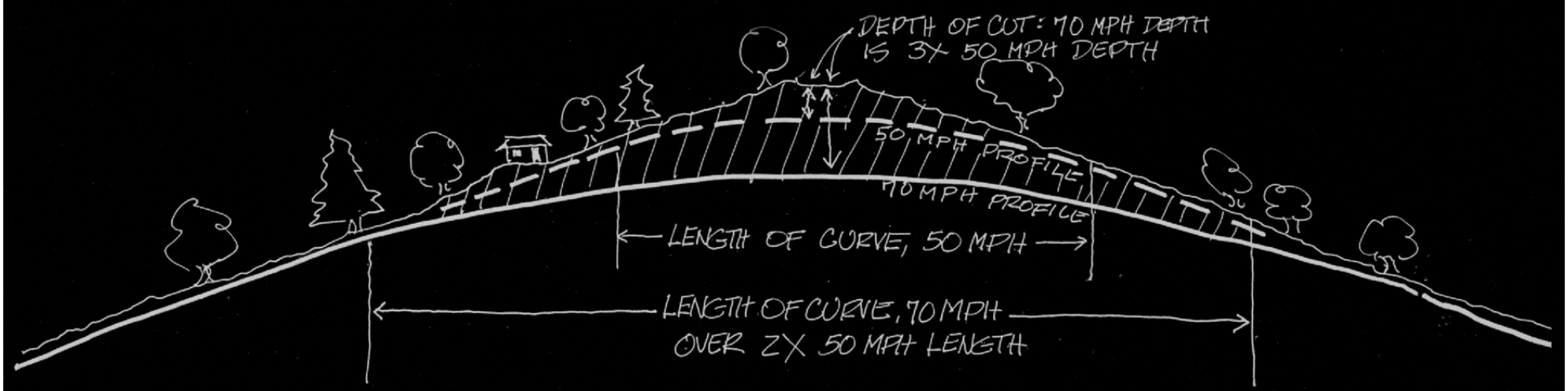
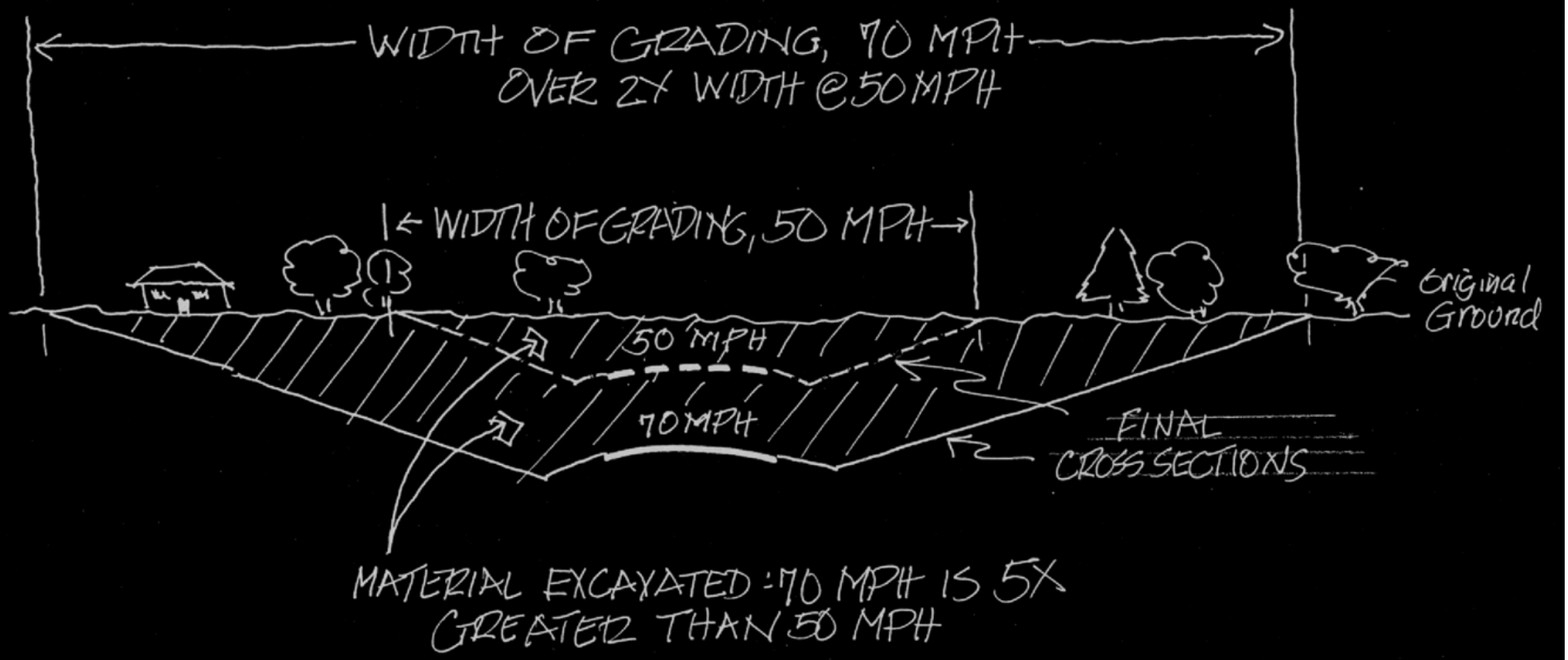


Reframing Key Transportation Conventions
DESIGN SPEED - Roadway Safety



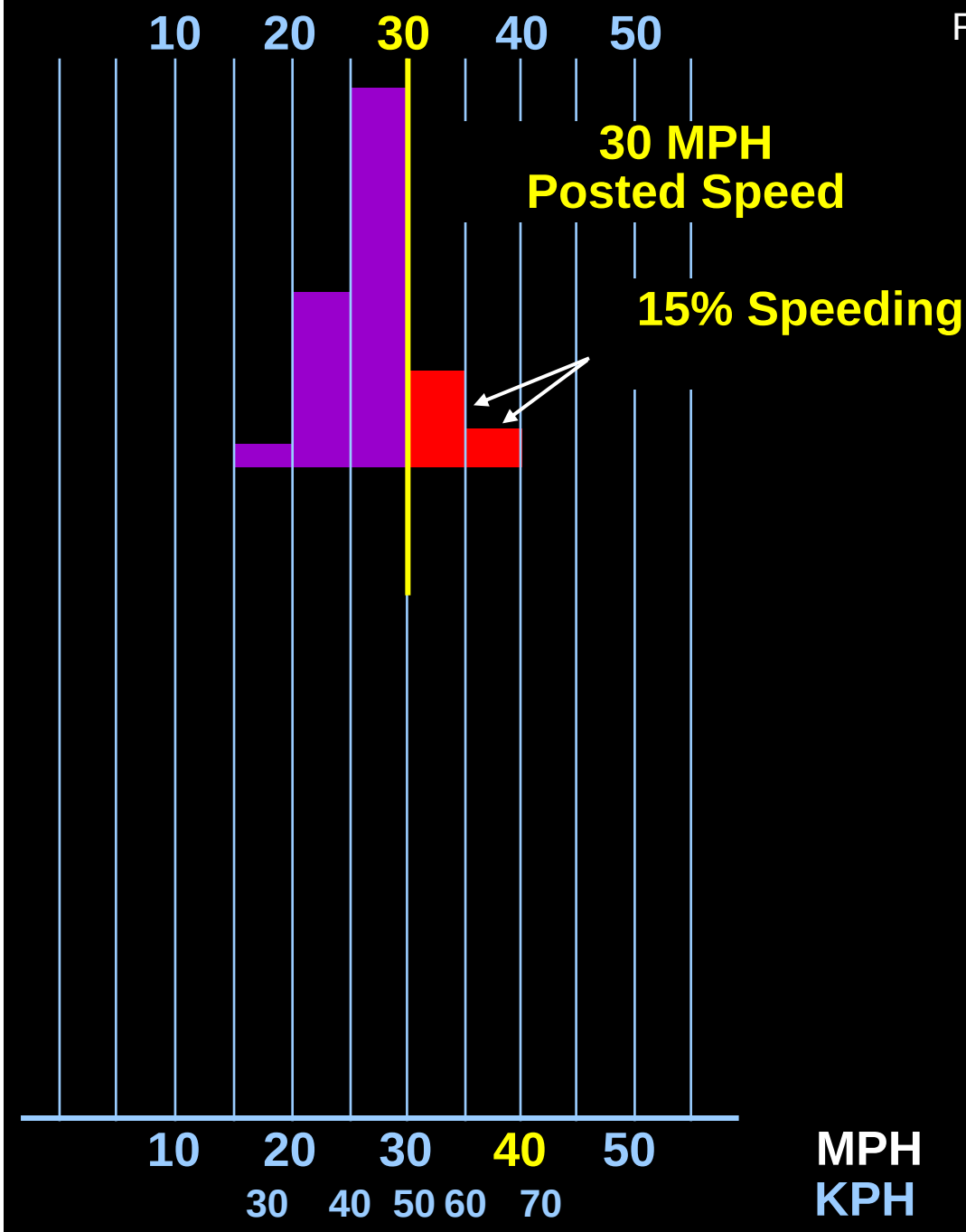
Impact of Road Widening

Developed by **Steve Price**
in association w/ Dover Kohl & Partners
& Glatting Jackson
for Johnson City,Tennessee

Impact of Road Widening

Reframing Key Transportation Conventions

DESIGN SPEED - Roadway Safety



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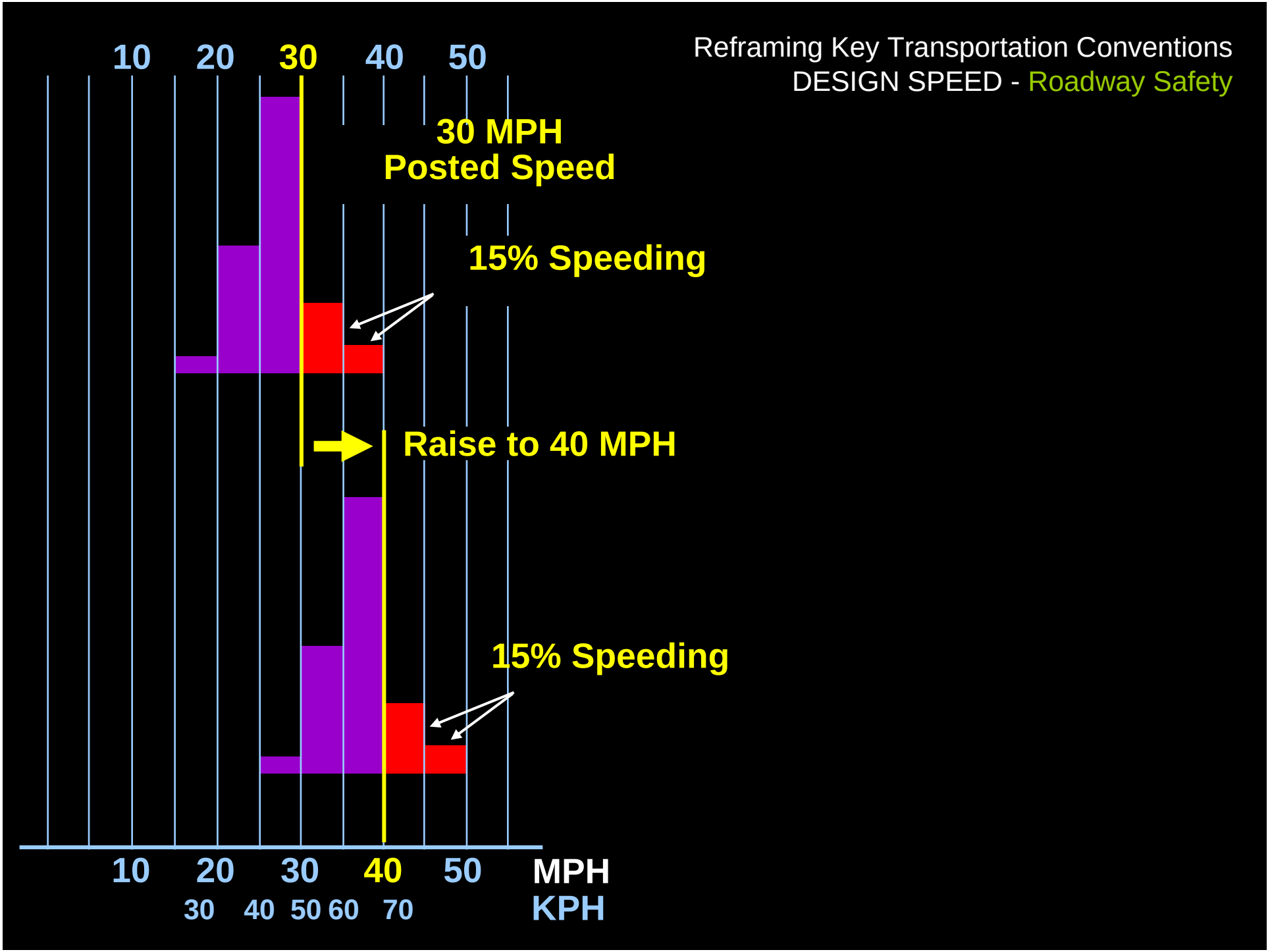
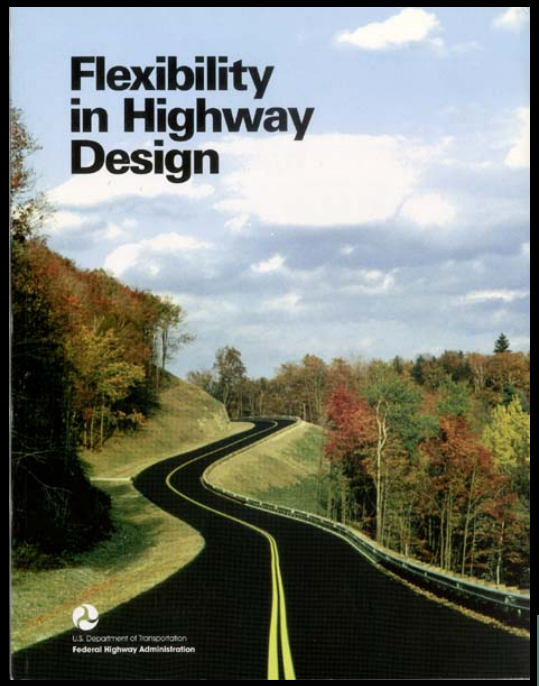
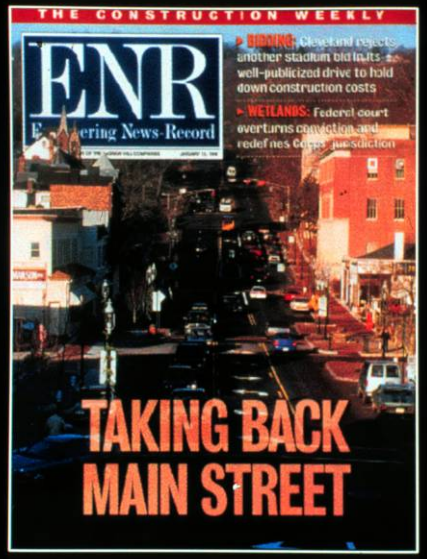
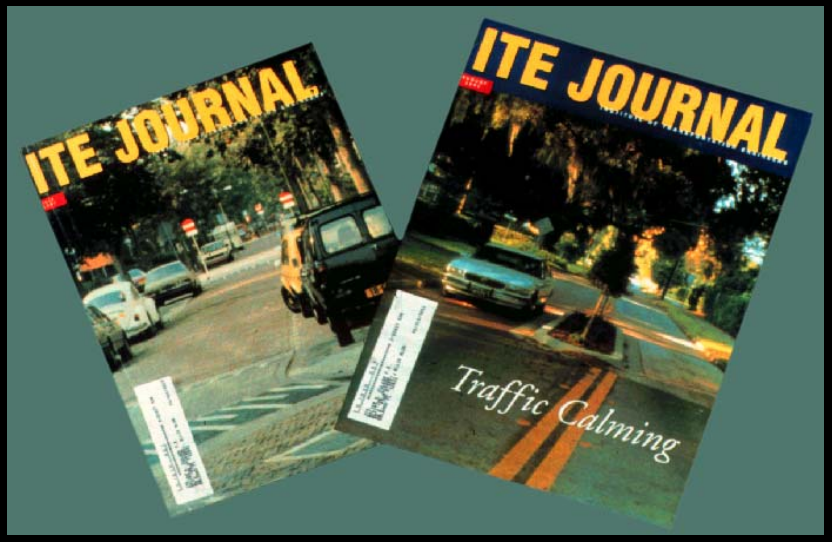
DESIGN SPEED - Roadway Safety



Reframing Key Transportation Conventions
DESIGN SPEED - Roadway Safety







Livable Transportation – Hot Topic

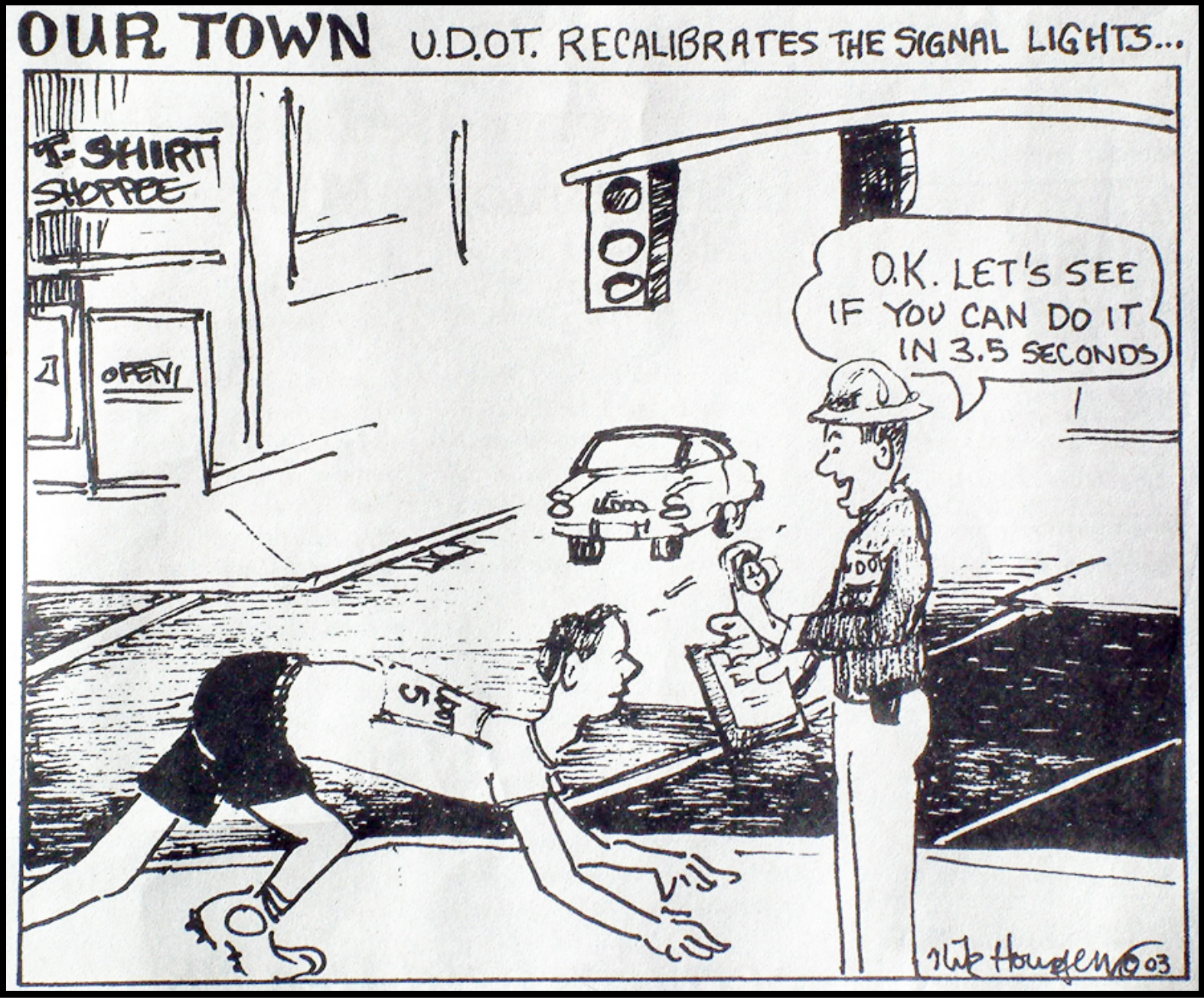

30 mph


25 mph

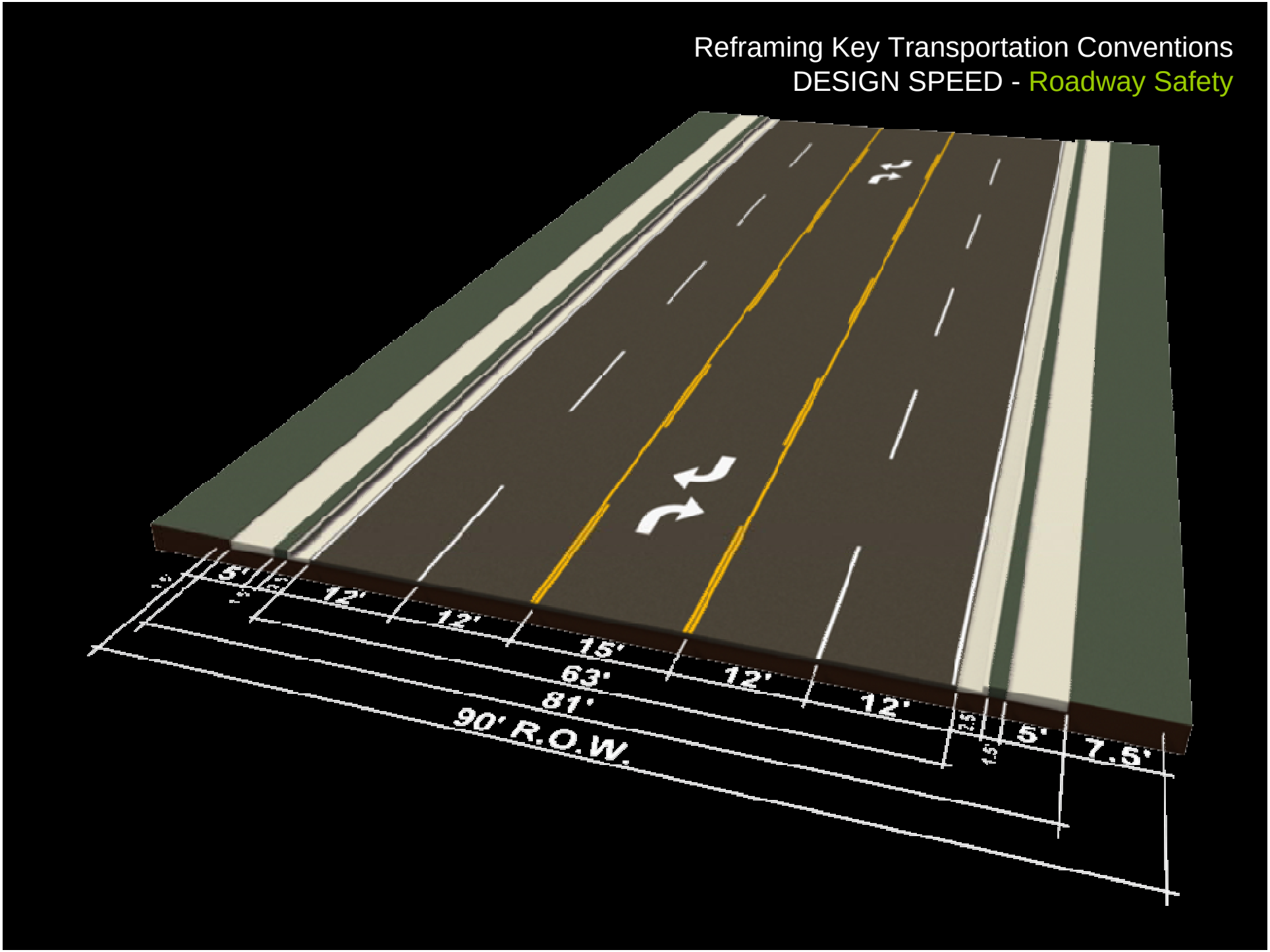

20 mph


15 mph

SPEED	p(killing pedestrian)
15 mph	3.5 %
31 mph	37.0 %
44 mph	83.0 %


OUR TOWN
U.D.OT. RECALIBRATES THE SIGNAL LIGHTS...
T-SHIRT SHOPPEE
OPEN!
O.K. LET'S SEE IF YOU CAN DO IT IN 3.5 SECONDS
DOT
Houlihan 03

Reframing Key Transportation Conventions
DESIGN SPEED - Roadway Safety



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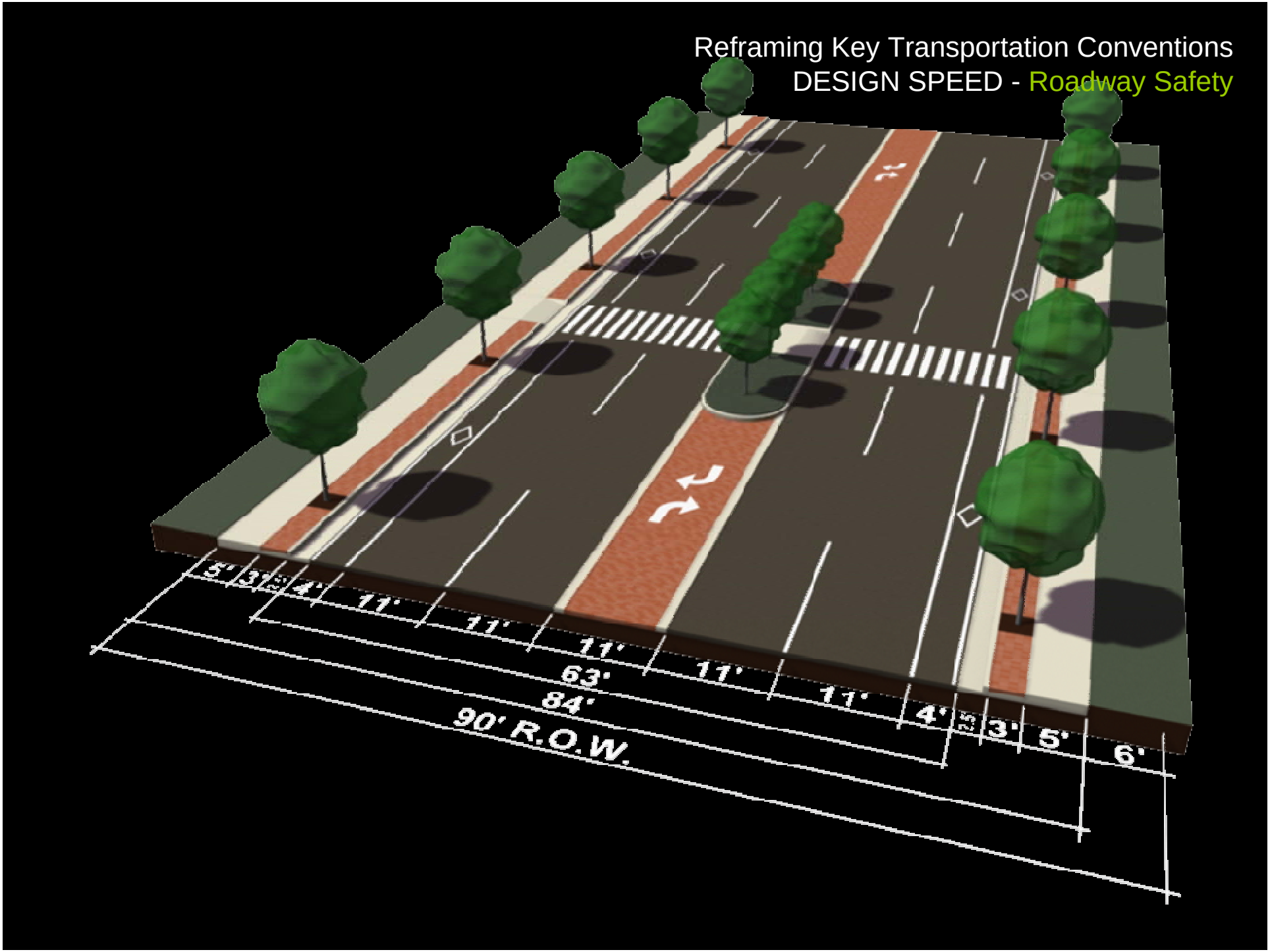

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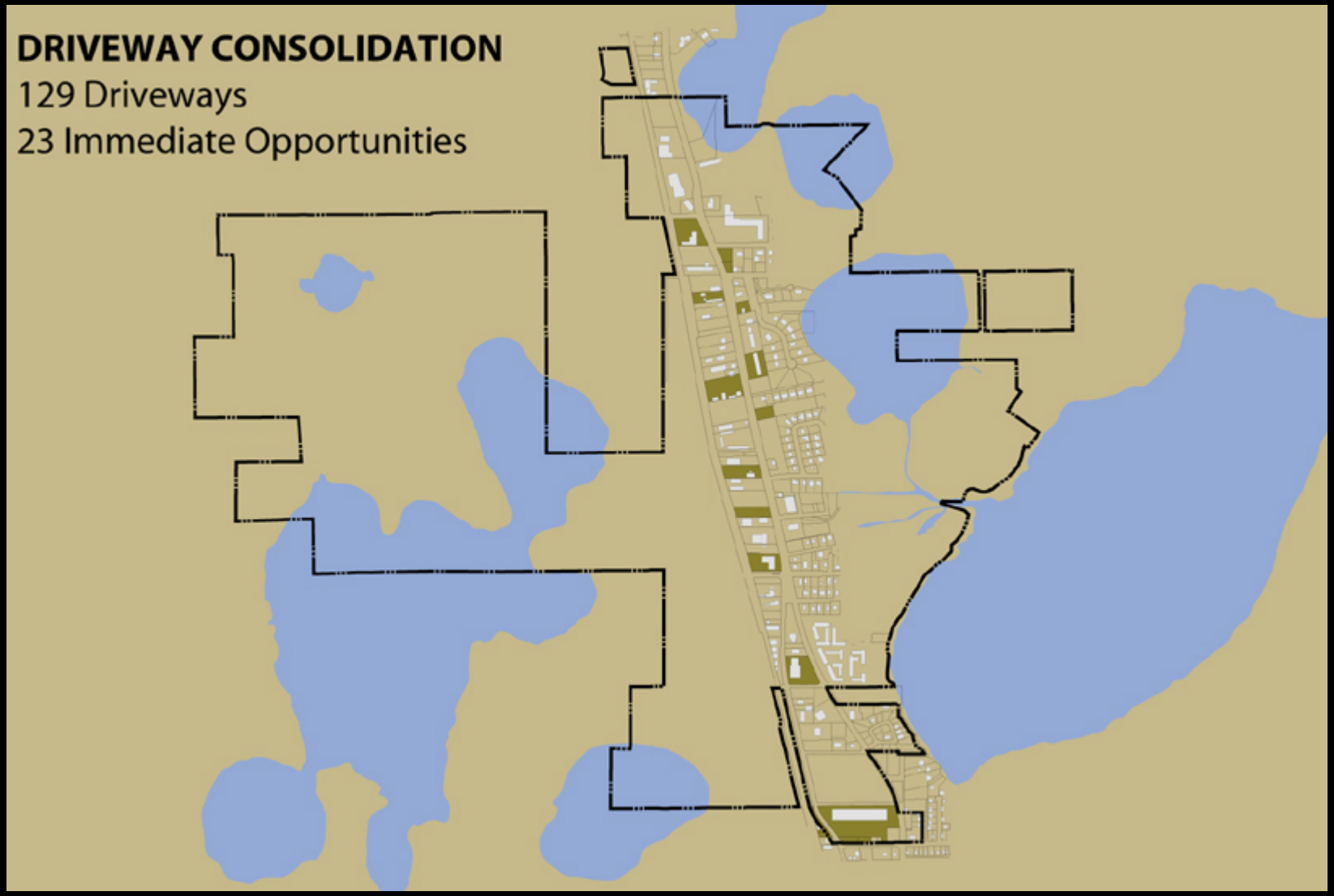
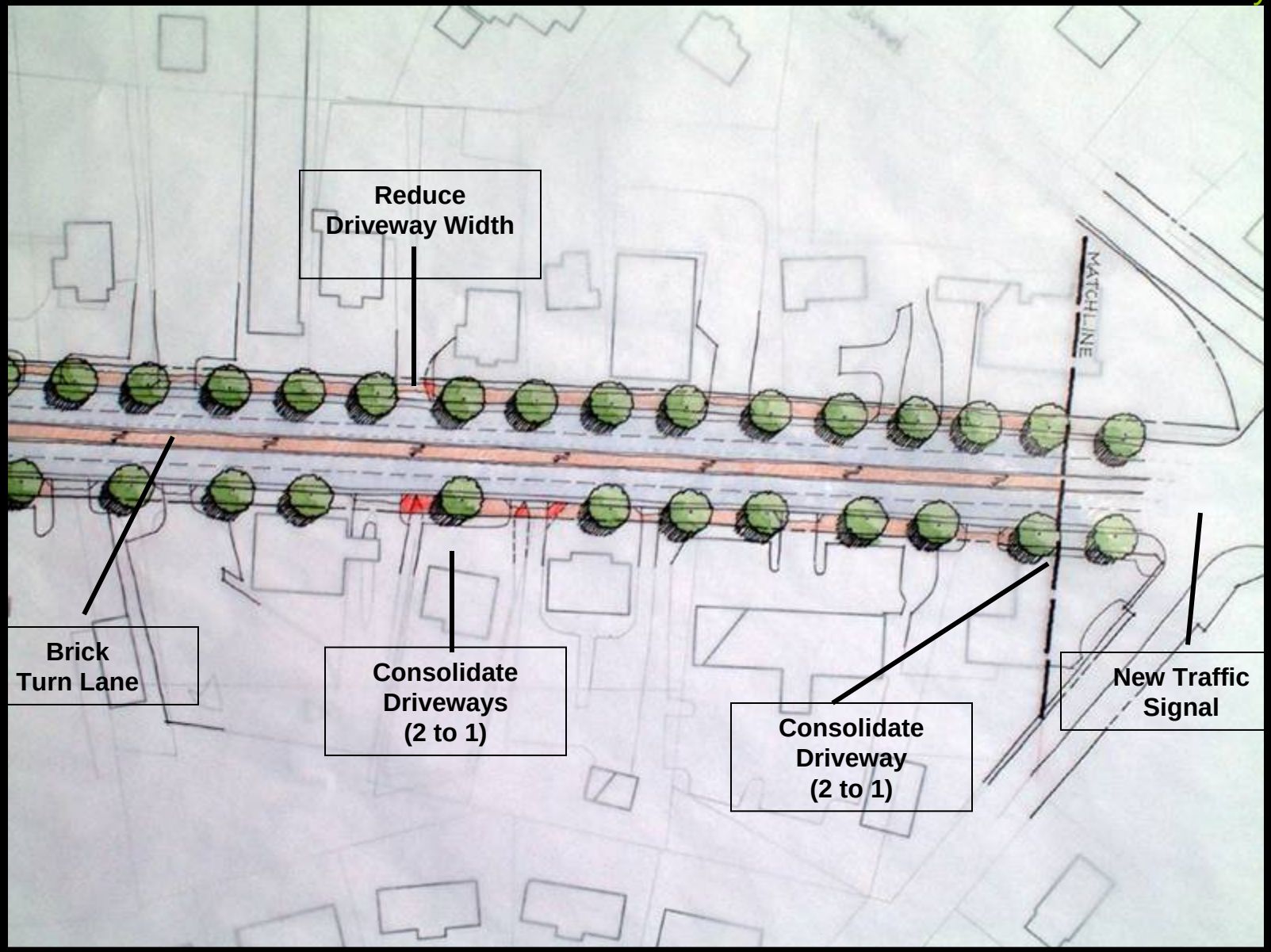

DRIVEWAY CONSOLIDATION
129 Driveways
23 Immediate Opportunities

Reframing Key Transportation Conventions

DESIGN SPEED - Roadway Safety



Reframing Key Transportation Conventions

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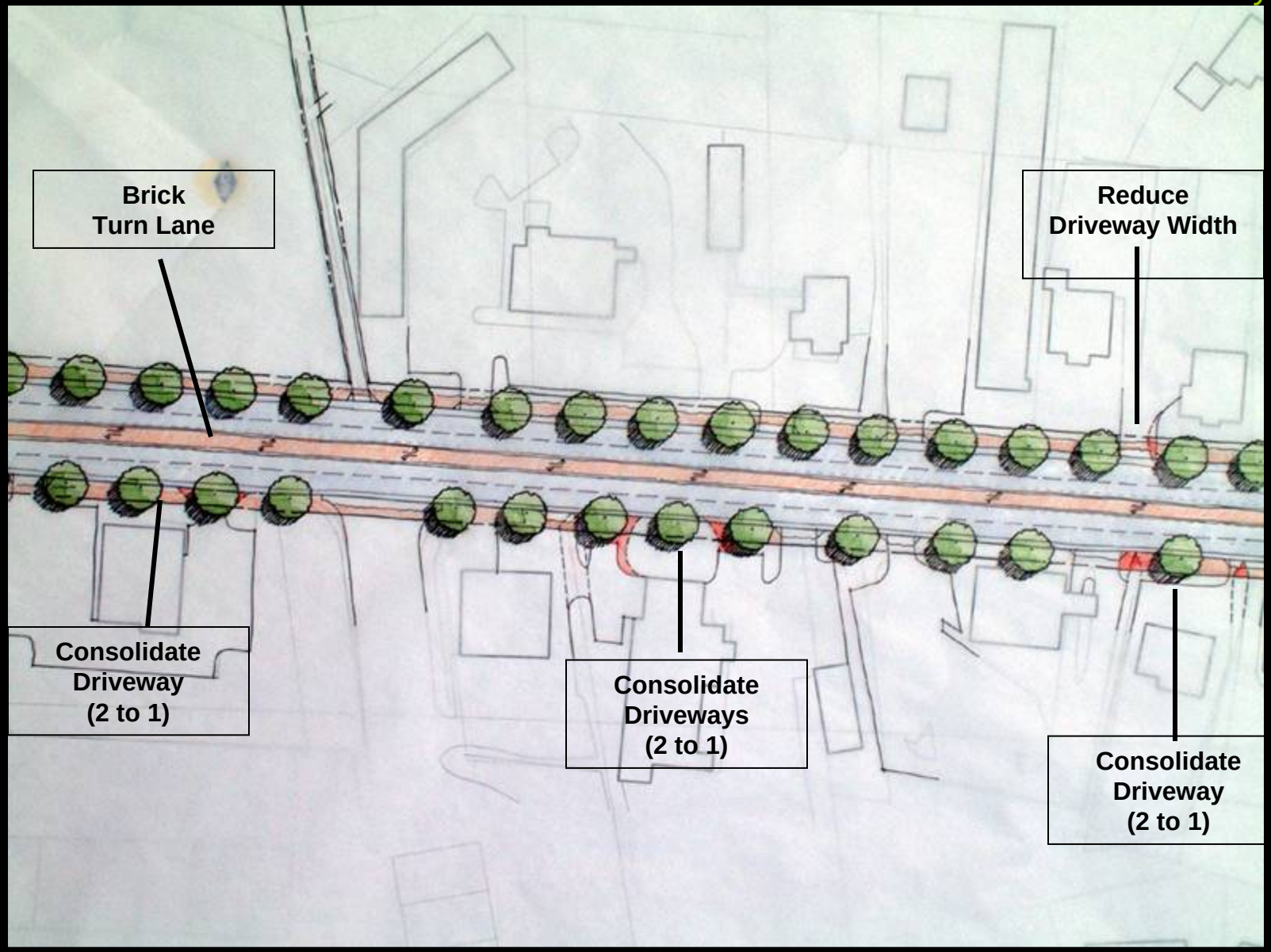

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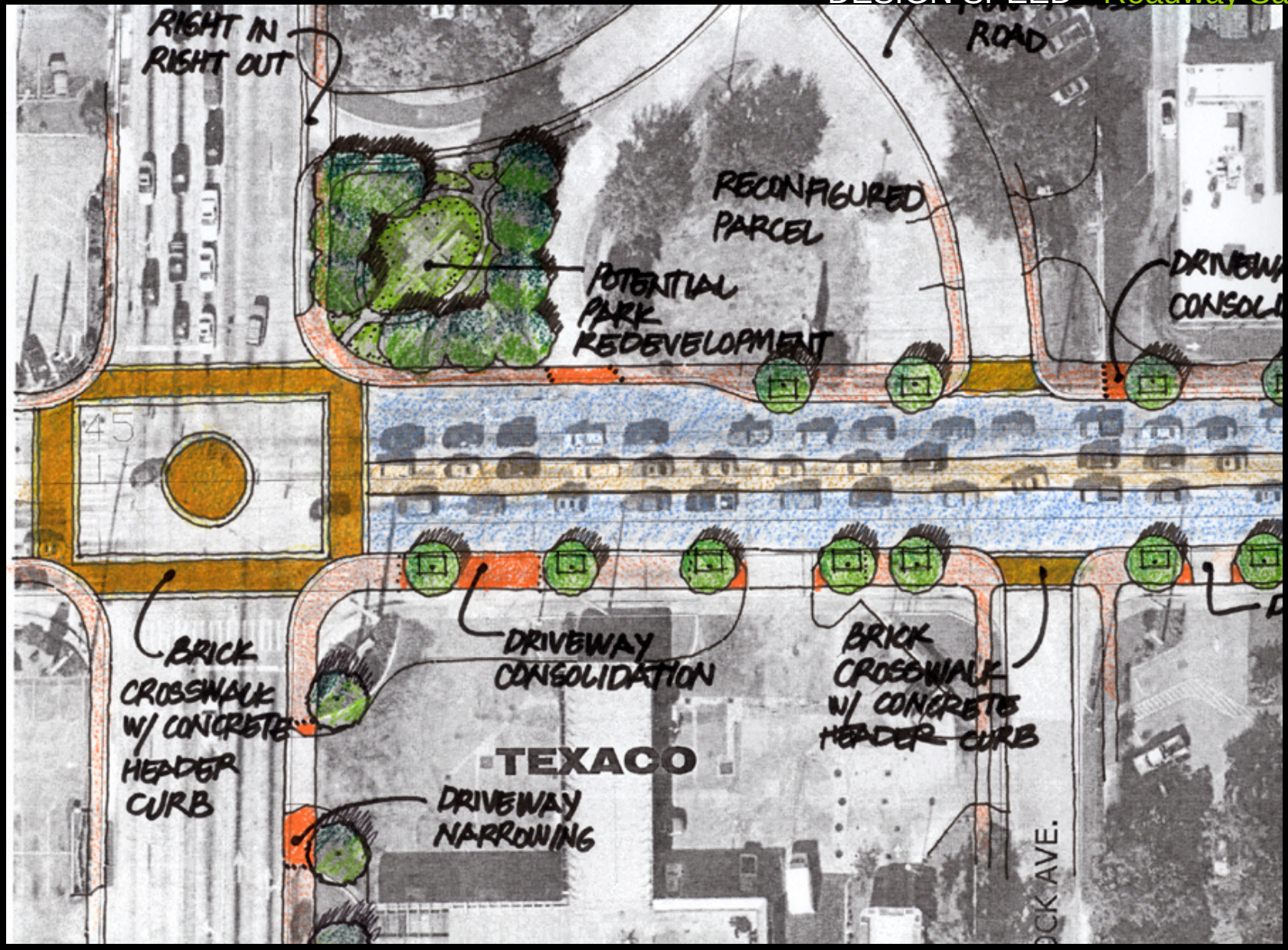

Access Management Plan

Reframing Key Transportation Conventions
DESIGN SPEED - Freight Routes

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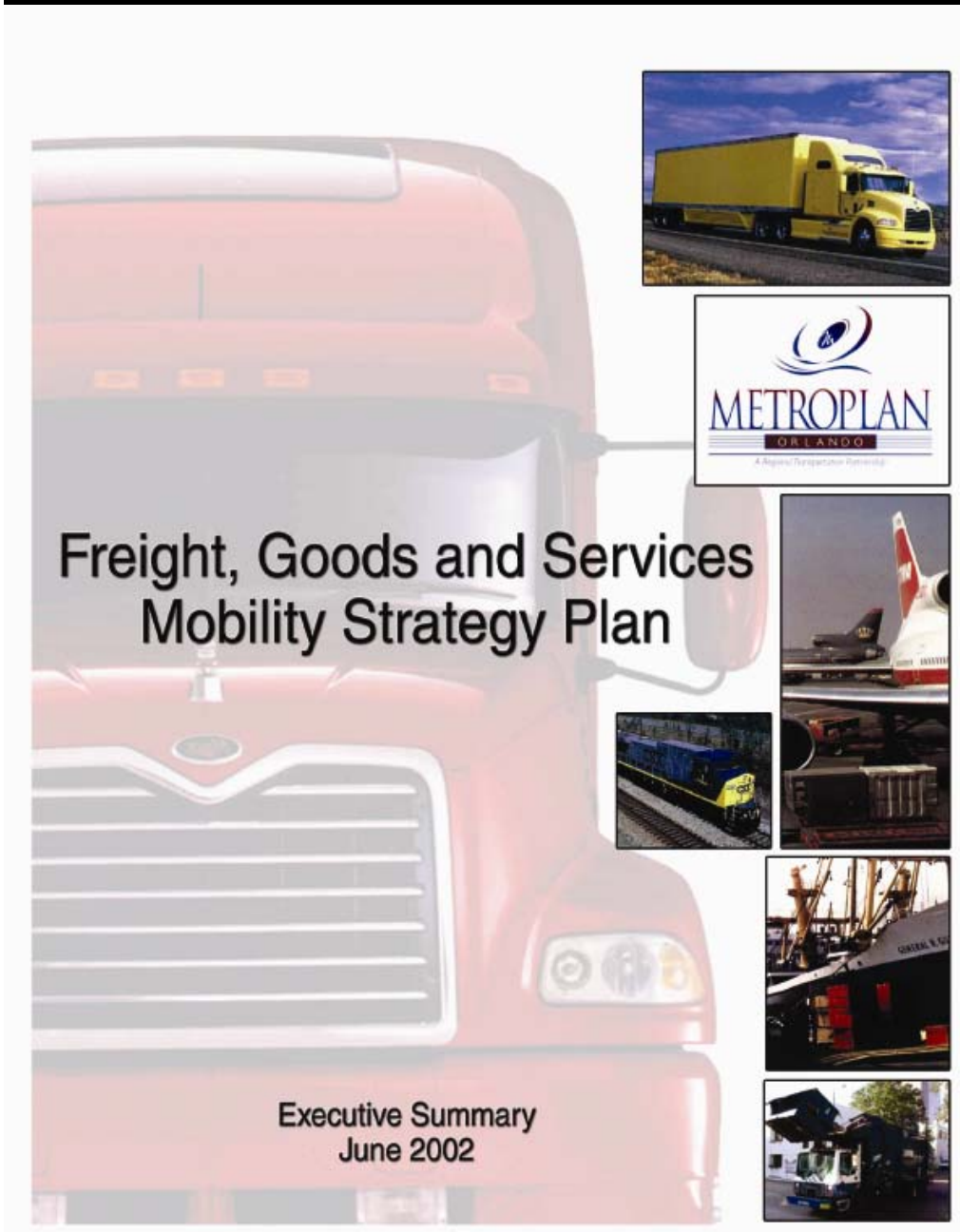
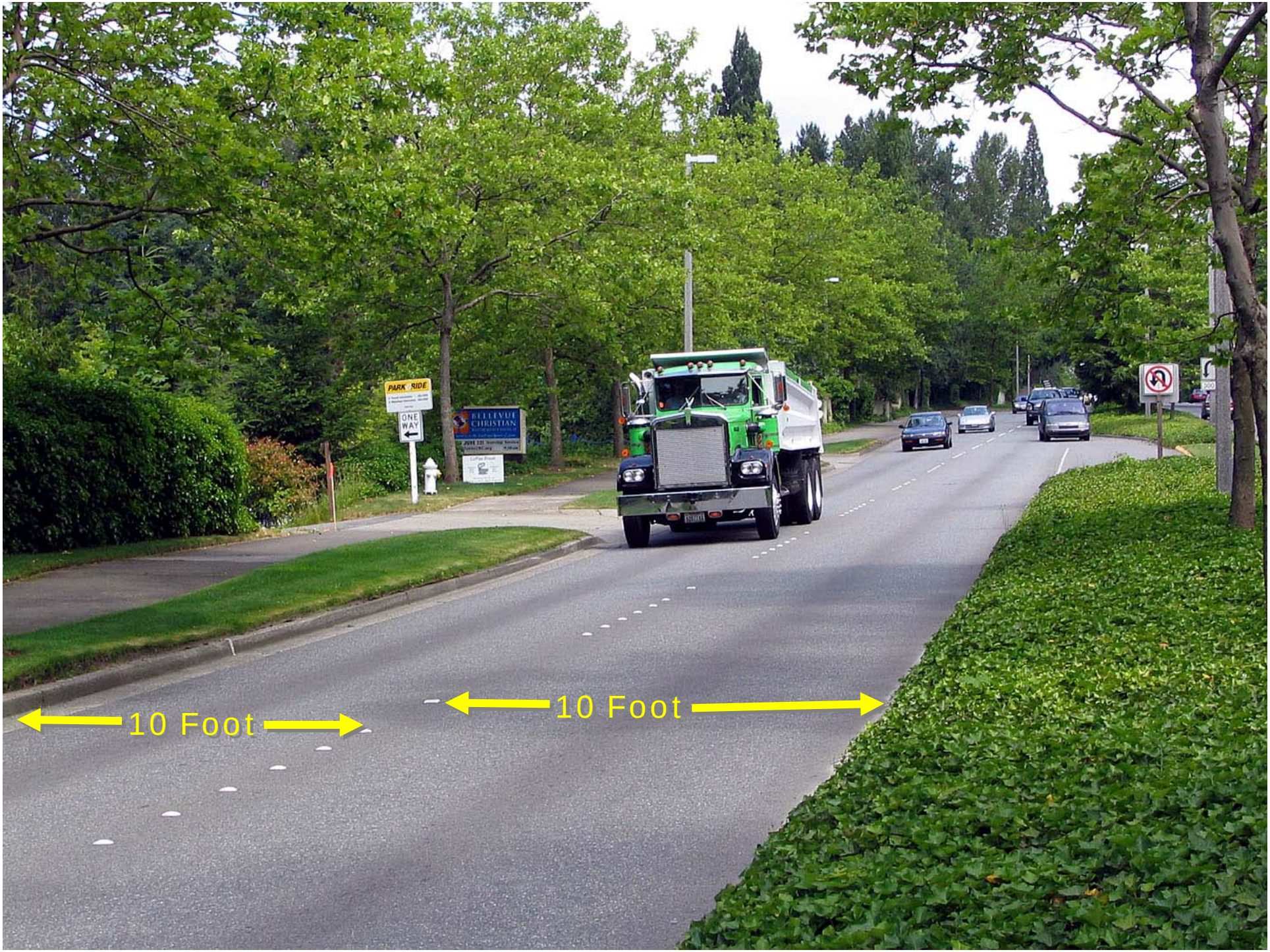
Reframing Key Transportation Conventions
DESIGN SPEED - Freight Routes



Study Steering Committee

The Consultant appreciates the oversight and direction provided by the Freight, Goods and Services Mobility Steering Committee.

Richard Harris
Chairman
Frank Irons
Orange County Convention Center
Bob Finken
Commercial Carrier Corporation
Ben Biscan
Florida Central Railroad
Mike Hoskinson
Consultant
Malcolm McLouth
Canaveral Port Authority
Karen Adamson
Florida Department of Transportation
Bob Kamm
Brevard MPO
David Warren
David Warren and Sons
George Green
Carroll Fulmer Trucking, Inc.
Nikki Eskow
CSX Transportation
Jim Laria
Greater Orlando Aviation Authority (retired)
Susan Sadighi
Florida Department of Transportation
David Grovdahl
METROPLAN ORLANDO
Dennis Hooker
METROPLAN ORLANDO
Muffet Robinson
METROPLAN ORLANDO
Vince Stevens
METROPLAN ORLANDO


10 Foot
10 Foot
PARK SIDE
ONE WAY
BELLEVUE CHRISTIAN

Reframing Key Transportation Conventions
DESIGN SPEED - Target Speed & Context

Determine Functional Classification

Hierarchy & Functional Class
Context

then

Establish Design Controls

Design Traffic
- The Role of the Regional Model
- Understanding the Travel Patterns – Trip Types
- Vehicle Types
- Defining the Context - Network and Mode Choice
- Role of Micro-Simulation
- Interpreting the Results – Capacity & Travel Time

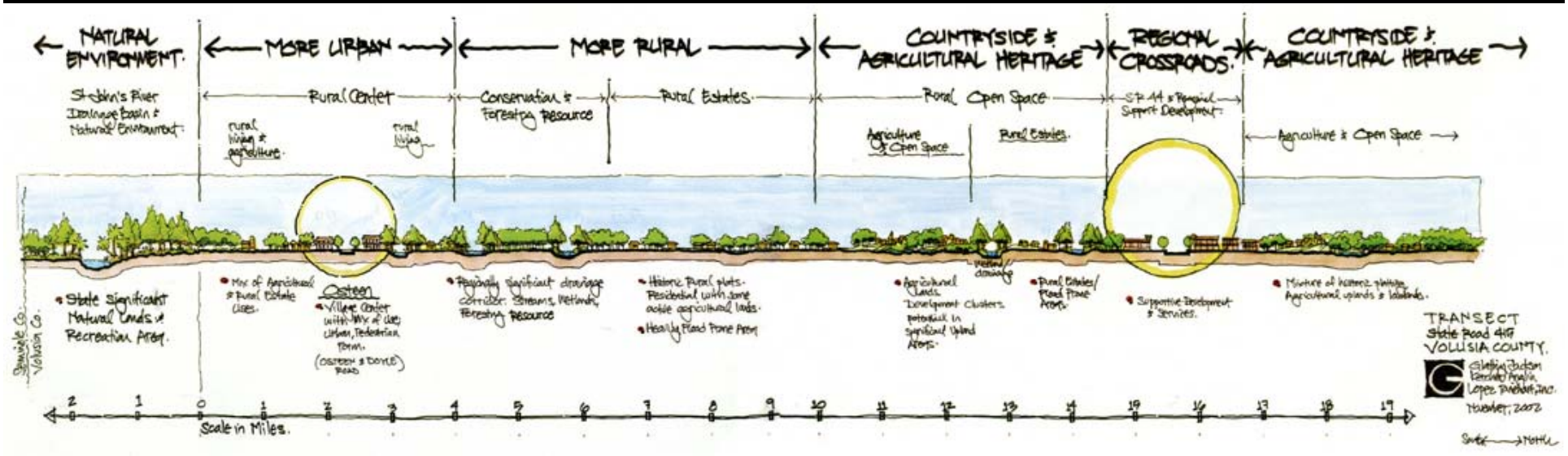
Design Speed
- Speed / Flow Relationship
- Roadway Safety
- Freight Routes
- Target Speed & Context

then

Fit Design Elements

Roadway Design Standards
- Geometric (Sight Distance / Stopping Distance)
- Dimensions
- Design Elements – Trees / Parking / Transit Stops
- AASHTO Design Guidelines
- State and Local Design Standards
- Design Variances and Exceptions

Reframing Key Transportation Conventions
DESIGN SPEED - Target Speed & Context

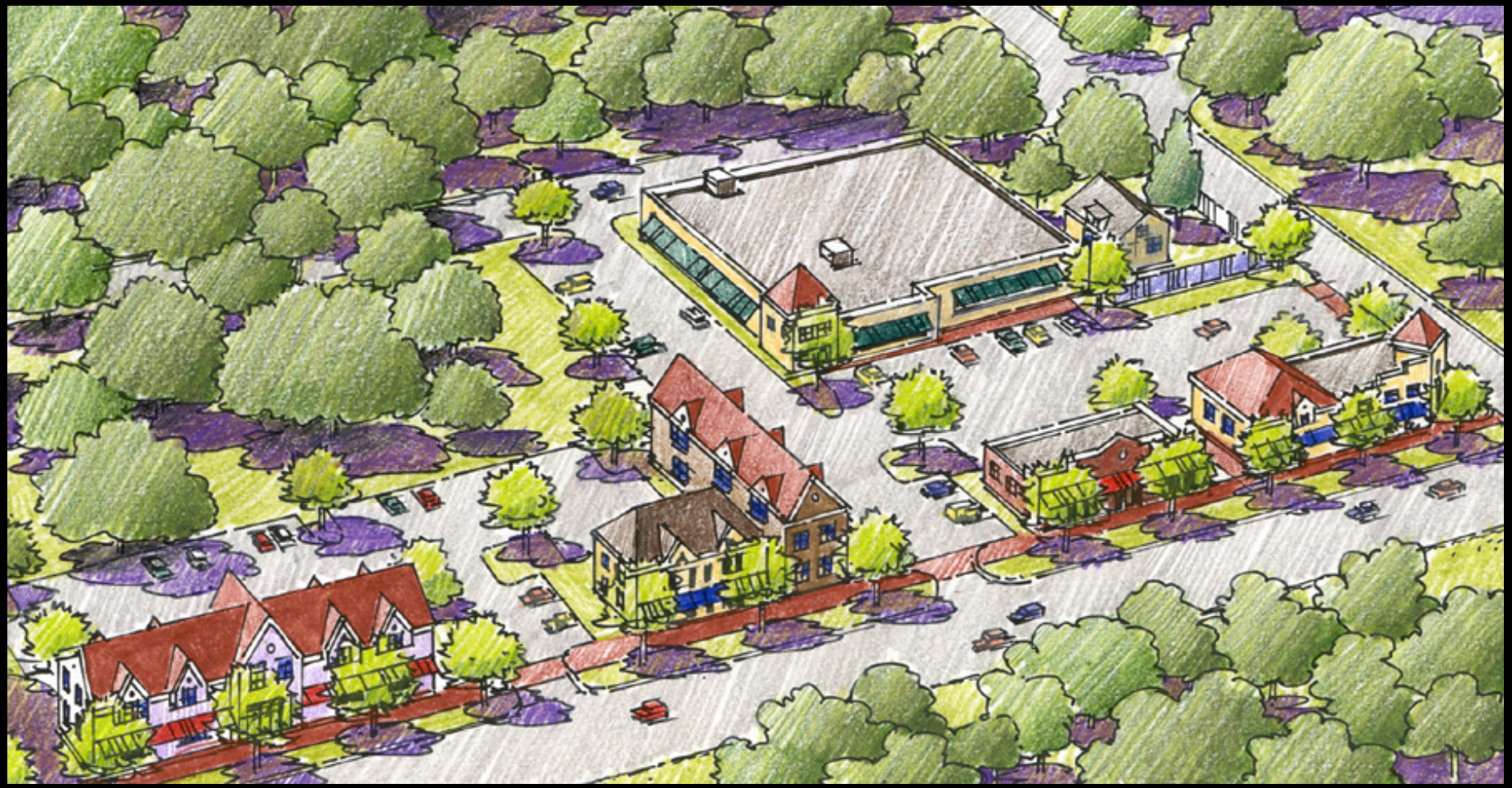


SR 415, Volusia County: Corridor Transect

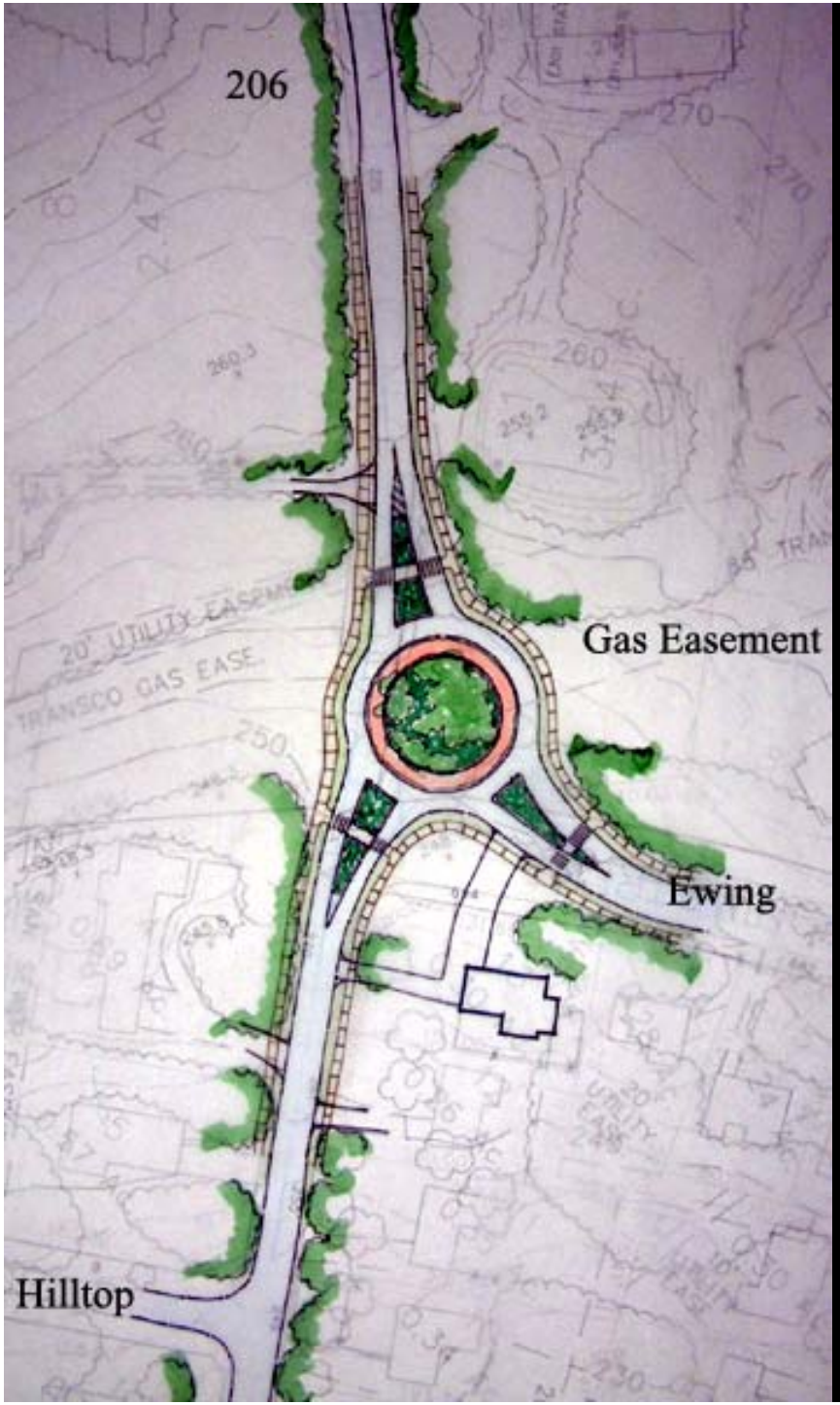
Reframing Key Transportation Conventions
DESIGN SPEED - Target Speed & Context

Context Changes

Reframing Key Transportation Conventions
DESIGN SPEED - Target Speed & Context



Context Changes



Reframing Key Transportation Conventions
DESIGN SPEED - Target Speed & Context

Maximum Design Speed, Not Minimum

i.e. Target Speed

Design

Elements

Reframing Key Transportation Conventions

DESIGN ELEMENTS

Determine Functional Classification

Hierarchy & Functional Class
Context

then

Establish Design Controls

Design Traffic

- The Role of the Regional Model
- Understanding the Travel Patterns – Trip Types
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Design Speed

- Speed / Flow Relationship
- Roadway Safety
- Freight Routes
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then

Fit Design Elements

Roadway Design Standards

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- Design Elements – Trees / Parking / Transit Stops
- AASHTO Design Guidelines
- State and Local Design Standards
- Design Variances and Exceptions

Reframing Key Transportation Conventions
DESIGN ELEMENTS - Geometrics

Determine Functional Classification

Hierarchy & Functional Class
Context

then

Establish Design Controls

Design Traffic
- The Role of the Regional Model
- Understanding the Travel Patterns – Trip Types
- Vehicle Types
- Defining the Context - Network and Mode Choice
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Design Speed
- Speed / Flow Relationship
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then

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Roadway Design Standards
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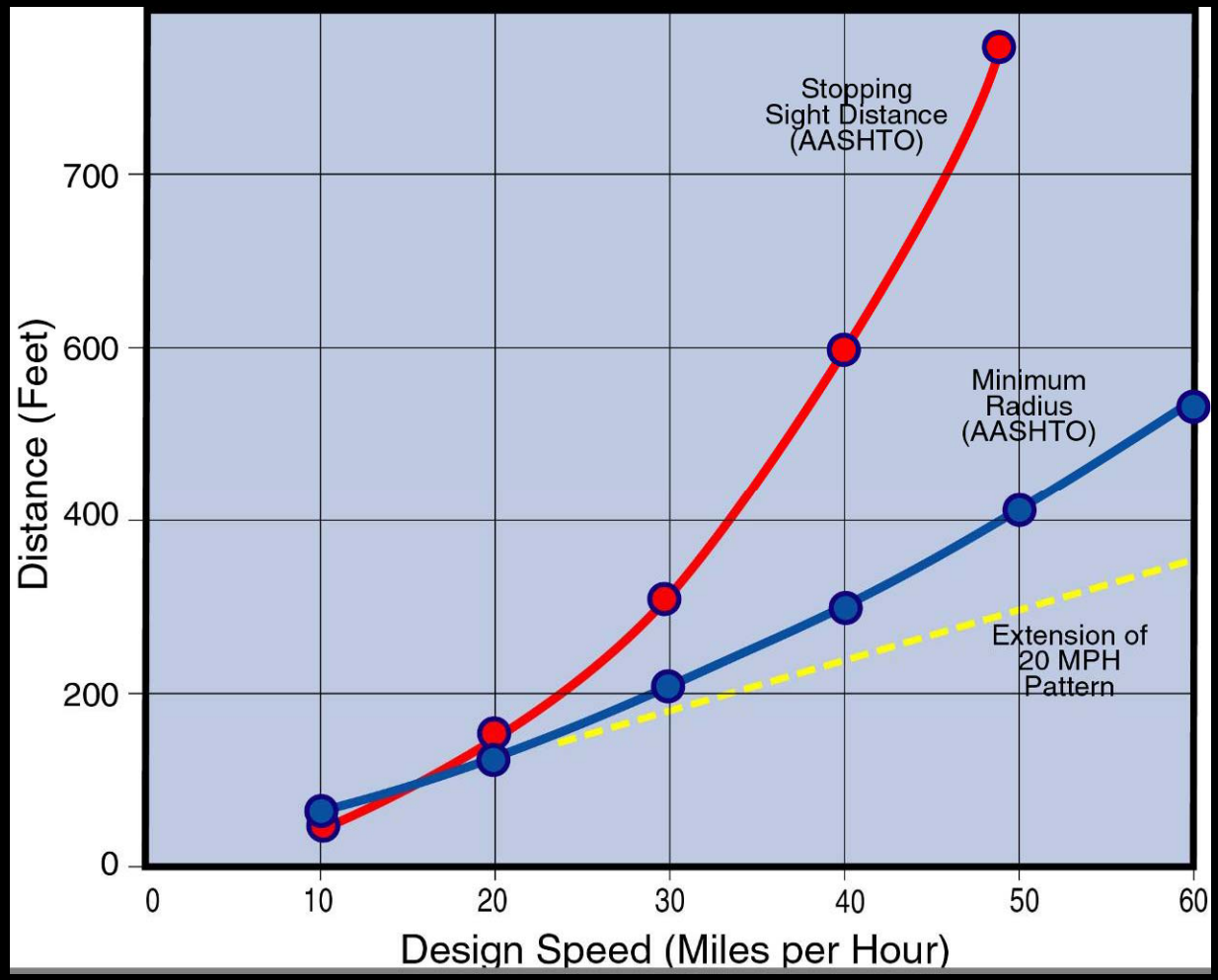

Basic Road Design Guidelines

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Dimensions

Determine Functional Classification

- Hierarchy & Functional Class
- Context

then

Establish Design Controls

- Design Traffic
  - The Role of the Regional Model
  - Understanding the Travel Patterns – Trip Types
  - Vehicle Types
  - Defining the Context - Network and Mode Choice
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then

Fit Design Elements

Roadway Design Standards

- Geometric (Sight Distance / Stopping Distance)
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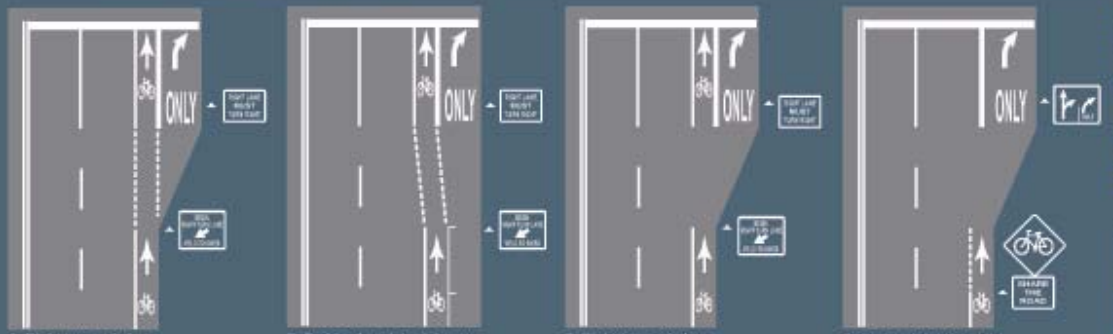
ROADWAY DESIGN ELEMENTS

INTERSECTIONS

Example: Intersection of Arterial Street with Collector Street

BICYCLE LANE AT INTERSECTION



A. Right-turn-only lane

B. Parking lane into right-turn-only lane

C. Right-turn-only lane

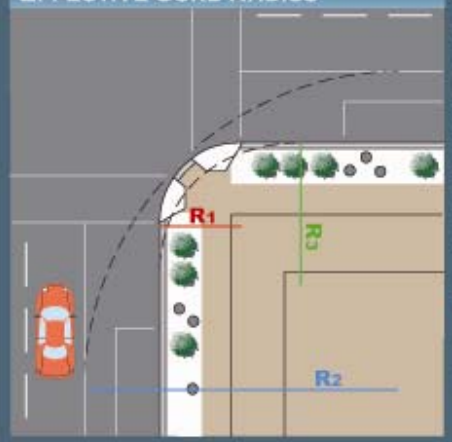
D. Optional right/straight and right-turn only

Note: The dotted lines in cases "A" and "B" are optional (see case "C".) Source: AASHTO Guide for the Development of Bicycle Facilities

CURB RETURN RADIUS	MIN.	MAX.
Local - Local	10'	25'
Local - Collector	15'	25'
Collector - Collector	15'	25'
Collector - Arterial	20'	50'
Arterial - Arterial	20'	50'
Arterial - Farm-to-Market	25'	50'

* Allow encroachment into adjacent lane by design vehicles when turning on low volume streets.

EFFECTIVE CURB RADIUS



Source: Main Street... When a Highway Runs Through It: A Handbook for Oregon Communities

Intersection design should safely accommodate both vehicles and pedestrians.

To comfortably accommodate pedestrians, minimize the curb return radius and intersection pavement width to the greatest extent possible.

KEY

R1 = Actual Curb Radius

R2 = Effective Radius

R3 = Curb radius needed without bike lane and parking

PEDESTRIAN CROSSING AT INTERSECTIONS

Source: ADA Standards for Accessible Design

ROADWAY DESIGN ELEMENTS

MEDIANS

Continuous Left-turn
Used on arterial streets in commercial areas with frequent driveway. If blocks are larger than 600', place pedestrian crossing with special treatment as well as pedestrian refuge island at intervals of 600' to 1420' (where possible).

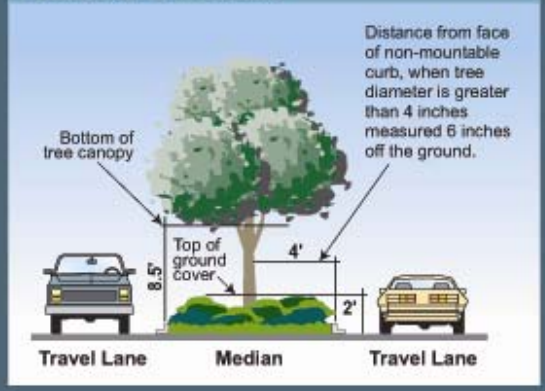
Narrow Median
Use on collector and arterial streets with infrequent driveways and intersections. Most commonly used for retrofit project where there is limited ROW. Landscape where feasible.

Wide Median
Use on arterial streets with less frequent driveways and intersections.

Rural Median

Optional In	Continuous Left-Turn	Narrow Median	Wide Median	Rural Median
Arterials				
Urban Activity Center	11' - 14'	4' - 6'	12' - 30'	
Industrial	12' - 14'		12' - 30'	24' - 50'
Rural Cluster				
Rural Agricultural				24' - 50'
Collectors				
Urban Activity Center	10' - 12'	4' - 6'	10' - 16'	
Rural Cluster	10' - 12'		10' - 16'	

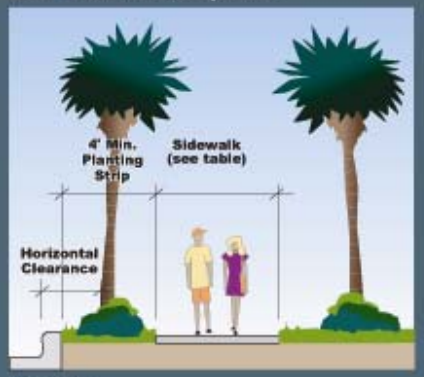
PLANTING IN MEDIANS



ROADWAY DESIGN ELEMENTS

WIDTH OF SIDEWALKS

Less Intense Development



Off Curb

More Intense Development

On Curb

LOCATION AND DESIGN OF SIDEWALKS

On arterial and collector streets, sidewalks should be located at the outside edge of the road right-of-way, except at intersections where they should be located as shown in the adjacent graphic.

The sidewalk grade should remain consistent along a roadway corridor. At locations where a driveway crosses a sidewalk, the grade of the driveway shall match that of the sidewalk.

Offset Sidewalk Intersection Treatment

SIDEWALK WIDTH	OFF CURB		ON CURB	
	Min. (feet)	Max. (feet)	Min. (feet)	Max. (feet)
Arterials				
Urban Activity Center	6	10	8	12
Rural Cluster	6	10	8	12
Industrial	6	8	6	8
Collector Street	6	8	6	8
Main Street	8	12	8	15
Neighborhood Streets				
Urban Activity Center	5	8		
Village Center	5	8		
Neighborhood	5	8		
Neighborhood Center	5	8		
Rural Cluster	5	8	6	8
Rural Agriculture	5	6	6	6

MINIMUM HORIZONTAL CLEARANCE WIDTH

Posted Speed < 25 mph: 1.5 feet from face of curb
Posted Speed ≥ 25 mph: 4 feet* from face of curb
* 1.5 feet under constrained conditions

ROADWAY RECONSTRUCTION

Provide sidewalk on both sides of the roadway for:
- Arterial in Urban Activity Centers and Rural Clusters
- Collectors in Urban Activity Centers, Village Centers, and Rural Clusters
- Neighborhood streets in Urban Activity Centers, Village Centers, and Neighborhood Centers

If ROW is constrained, may provide sidewalks on only one side of the roadway for:
- Arterials in Industrial land use type
- Collectors in Industrial land use type
- Neighborhood streets in Neighborhoods, Rural Clusters, and Rural Agricultural land use types

ROADWAY DESIGN ELEMENTS

Tree Spacing in Sight Triangle

Description	Speed (mph)													
	30		35		40		45		50		55		60	
Maximum caliper (diameter) within limits of sight window (mm)	>4" ≤ 11"	>11" ≤18"	>4" ≤ 11"	>11" ≤ 18"	>4" ≤ 11"	>11" ≤18"	>4" ≤ 11"	>11" ≤ 18"	>4" ≤ 11"	>11" ≤18"	>4" ≤ 11"	>11" ≤ 18"	>4" ≤ 11"	>11" ≤ 18"
Minimum spacing (c. to c. of trunk) (ft)	22	91	27	108	33	126	40	146	45	165	52	173	60	193

Source: FDOT

Sizes and spacing are based on the following conditions:

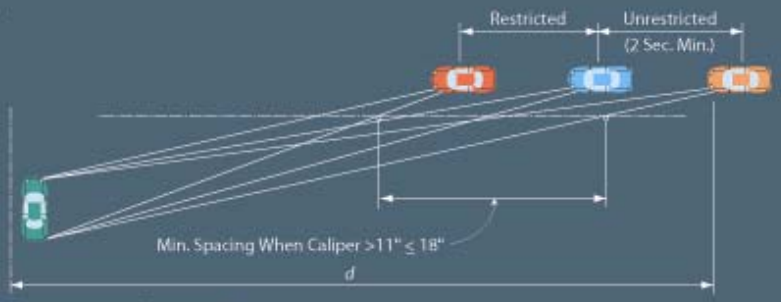
A. A single line of trees in the median parallel to but not necessarily colinear with the centerline.

B. A straight approaching mainline within skew limits.

C. 1. Trees and palms ≤ 11" in diameter casting a vertical 6' wide shadow band on a vehicle entering at stop bar location when viewed by mainline driver beginning at distance 'd.'

2. Sabal palms with diameters ≥ 11" - < 18" spaced at intervals providing a 2 second full view of entering vehicle at stop bar location when viewed by mainline driver beginning at distance 'd' (see perception diagram).

See FDOT 2002 Design Standards, Index No. 546, for further information.



Perception Diagram

Location of Shade Trees

Shade trees shall be located to provide shade to users of the sidewalks and multi-use trails. On arterial and collector roadways, shade trees should be located between the travel lane and the sidewalk. To provide personal security, users of the sidewalks must be visible from vehicles in the travel lane. Landscaping located between the travel lanes and the sidewalk must not block these views. Therefore, shrubs and tree canopies should be pruned to allow visibility from vehicles in the travel lane to users of the sidewalk.

Location of Traffic Control Devices, Light Poles, and Above Ground Utilities

Traffic Control Devices will be designed and located in accordance with the Manual of Uniform Traffic Control Devices and Roadway and Traffic Design Standards

Light Poles and Utilities if not Placed Underground:

No Curb - Outside of Clear Zone

Curb Present - Outside of Horizontal Clearance area. If placed in sidewalk, must maintain 4 feet of unobstructed sidewalk area.

CORRIDOR TYPE: ARTERIAL

Urban Activity Center

LAND USE CLASSIFICATION: URBAN ACTIVITY CENTER

REQUIRED	OPTIONAL
• Curb and gutter • Street and pedestrian scale lighting • Shade trees • Sidewalks • Transit stops with benches (if service is provided) • Pedestrian activated crossing signal at signalized intersections • Bicycle lane or wide outside travel lane	• On-street parking • Planting strip • Mid block pedestrian crossing • Raised median • Continuous left turn lane • Bus Shelters

DESIGN ELEMENT	MINIMUM Width (feet)	MAXIMUM Width (feet)
• Vehicle lanes (when bicycle lane is present)	10	12
• Outside vehicle lane (no bicycle lane present)	14	14
• Raised median		
- infrequent driveways and intersections	4	6
- short blocks, left turn lanes	12	30
• Continuous left turn lanes	11	14
• Bicycle lane	4	5
• Parking lane		
- with bicycle lane	7	7
- no bicycle lane	8	10
• Planting strip	4	8
• Sidewalk		
- on curb	8	12
- off curb	6	10
• ROW width	80	130

DESIGN SPEED: 35 MPH - 45 MPH

Continuous left turn line/bicycle lane

Note: *Where ROW permits, it is always preferred to provide a bicycle lane.*

DESIGN SPEED: 35 MPH - 45 MPH

Raised median/wide outside travel lane

CORRIDOR TYPE: COLLECTOR STREET

Urban Activity Center

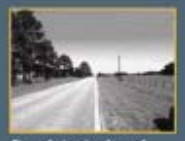
LAND USE CONTEXT: URBAN ACTIVITY CENTER

REQUIRED	OPTIONAL
• Bike lanes • Curb and gutter • Planting strip • Pedestrian scale lighting • Shade trees • Sidewalks • Transit stop with benches, where transit service is provided	• Median • Parking • Bulbouts and neckdowns (when parking is provided) • Bus Shelter

DESIGN ELEMENT	MINIMUM Width (feet)	MAXIMUM Width (feet)
• Vehicle lanes	10	11
• Bike lanes (without parking)	4	-
• Bike lanes (with parking)	5	-
• Narrow Median	4	6
• Continuous left turn lane	10	12
• Raised Median	10	16
• Parking	7	-
• Planting strip	4	8
• Sidewalk	6	8
• ROW Width	40	80

DESIGN SPEED: 30-35 MPH

CORRIDOR TYPE: COLLECTOR STREET


Rural Agricultural

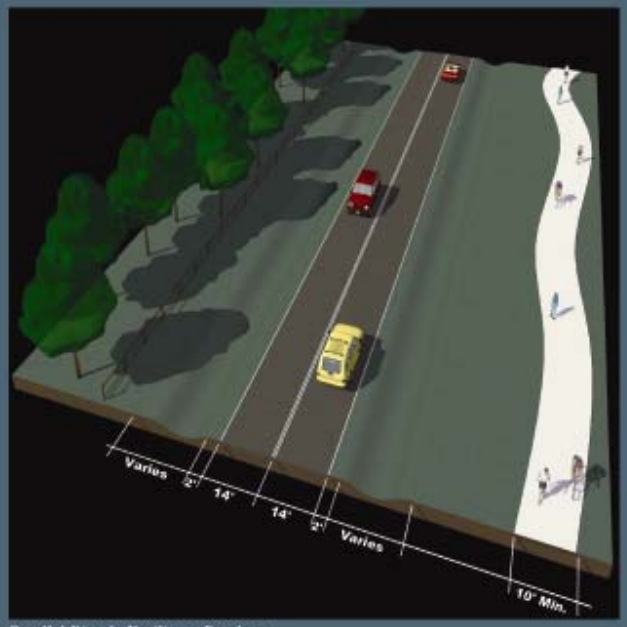

Industrial

LAND USE CONTEXT: RURAL AGRICULTURAL/INDUSTRIAL

REQUIRED	OPTIONAL
• Bike lanes or bikeway	• Curb and gutter • Planting strip • Lighting • Shade trees • Sidewalk

DESIGN ELEMENT	MINIMUM Width (feet)	MAXIMUM Width (feet)
• Vehicle lane		
- bike lane in travelway	10	11
- outside lane, no bike lane in travelway	14	14
• Bike lane (curb)	4	5
• Bike lane (no curb)	5	6
• Sidewalk	6	8
• Multiuse trail	10	
• ROW	50	80

BIKEWAY (SEPARATE MULTIUSE TRAIL OPTIONAL)
DESIGN SPEED: 30- 35 MPH
DESIGN VOLUME: LESS THAN 1500 VPD



Parallel Bicycle Facility to Roadway

BICYCLE LANE
DESIGN SPEED: 30- 35 MPH
DESIGN VOLUME: LESS THAN 1500 VPD

Bicycle Facility in Roadway


Rural Agricultural Area - Collector Street

CORRIDOR TYPE: COLLECTOR STREET

Rural Cluster

LAND USE CONTEXT: RURAL CLUSTER

REQUIRED	OPTIONAL
• Bike lanes • Planting strip • Shade trees • Sidewalks	• Median • Parking • Curb and gutter • Bulbouts and neckdowns (When parking is provided) • Pedestrian scale lighting at intersections

DESIGN ELEMENT	MINIMUM Width (feet)	MAXIMUM Width (feet)
• Vehicle lanes	10	11
• Median (continuous left turn lane)	10	12
• Raised Median	10	16
• Bike lanes (without parking)	4	-
• Bike lanes (with parking)	5	-
• Parking	7	-
• Planting strip	4	8
• Sidewalk	6	8
• ROW Width	50	80

DESIGN SPEED: 30-35 MPH

CORRIDOR TYPE: MAIN STREET


Urban Activity Center


Village Center


Rural Cluster

LAND USE CONTEXT: URBAN ACTIVITY CENTER/ VILLAGE CENTER/RURAL CLUSTER

REQUIRED	OPTIONAL
• On-street parking • Bulb-outs with landscaping • Gutter • Shade trees • Pedestrian scale lighting • Shelter at bus stop (if served by transit) • Pedestrian crosswalk treatment	• Bicycle lane • Curb

DESIGN ELEMENT	MINIMUM Width (feet)	MAXIMUM Width (feet)
• Vehicle lane width	10	11
• Bicycle lane	5	5
• Parallel parking		
- with bike lane	7	7
- without bike lane	7	9
• Angled parking		
- length	19	20
- width	9	11
• Sidewalk	8	15
• ROW width	56	82

PARKING OPTIONS

PARALLEL PARKING

FRONT END ANGLED PARKING

REAR END ANGLED PARKING

Note: Width of parking lane may be measured from face of curb, and may include all or a portion of the gutter.

SIDEWALK OPTIONS

STROLL

Allows for 2 way pedestrian travel and amenities such as benches and trash receptacles.

PLAZA

Provides space for outdoor dining or cafe.

DESIGN SPEED: 25-30 MPH

DESIGN SPEED: 25-30 MPH

DESIGN SPEED: 25-30 MPH

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements

Determine Functional Classification

Hierarchy & Functional Class
Context

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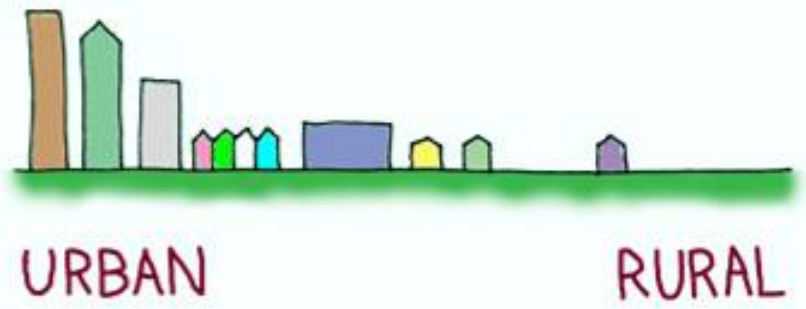
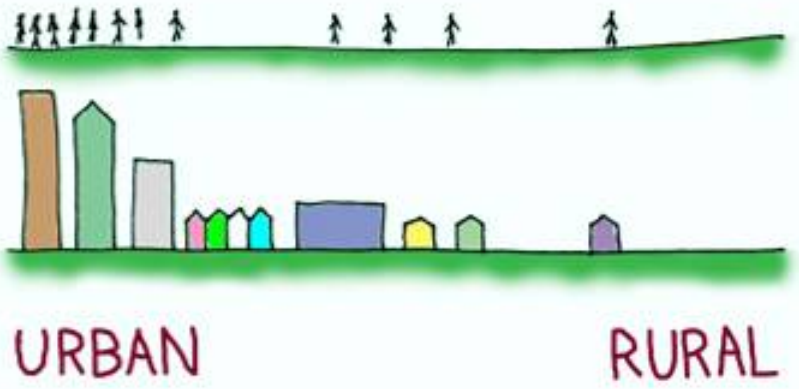


Buildings

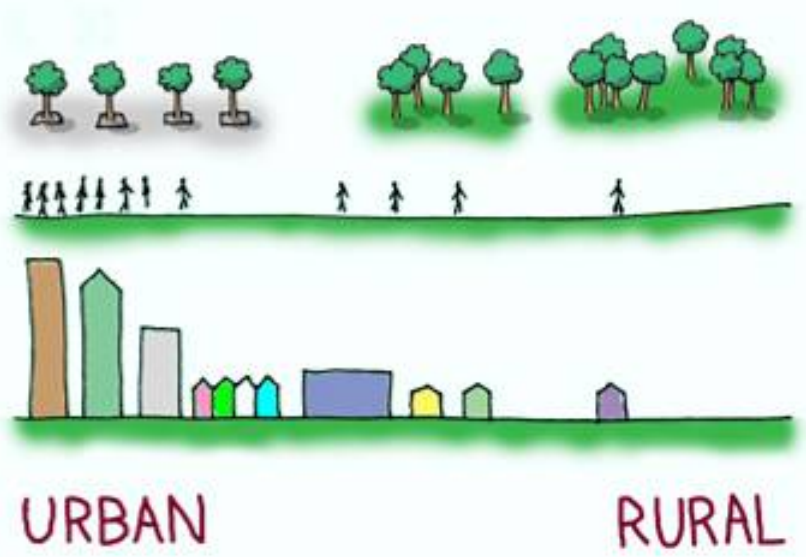
Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements



People

Buildings

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements

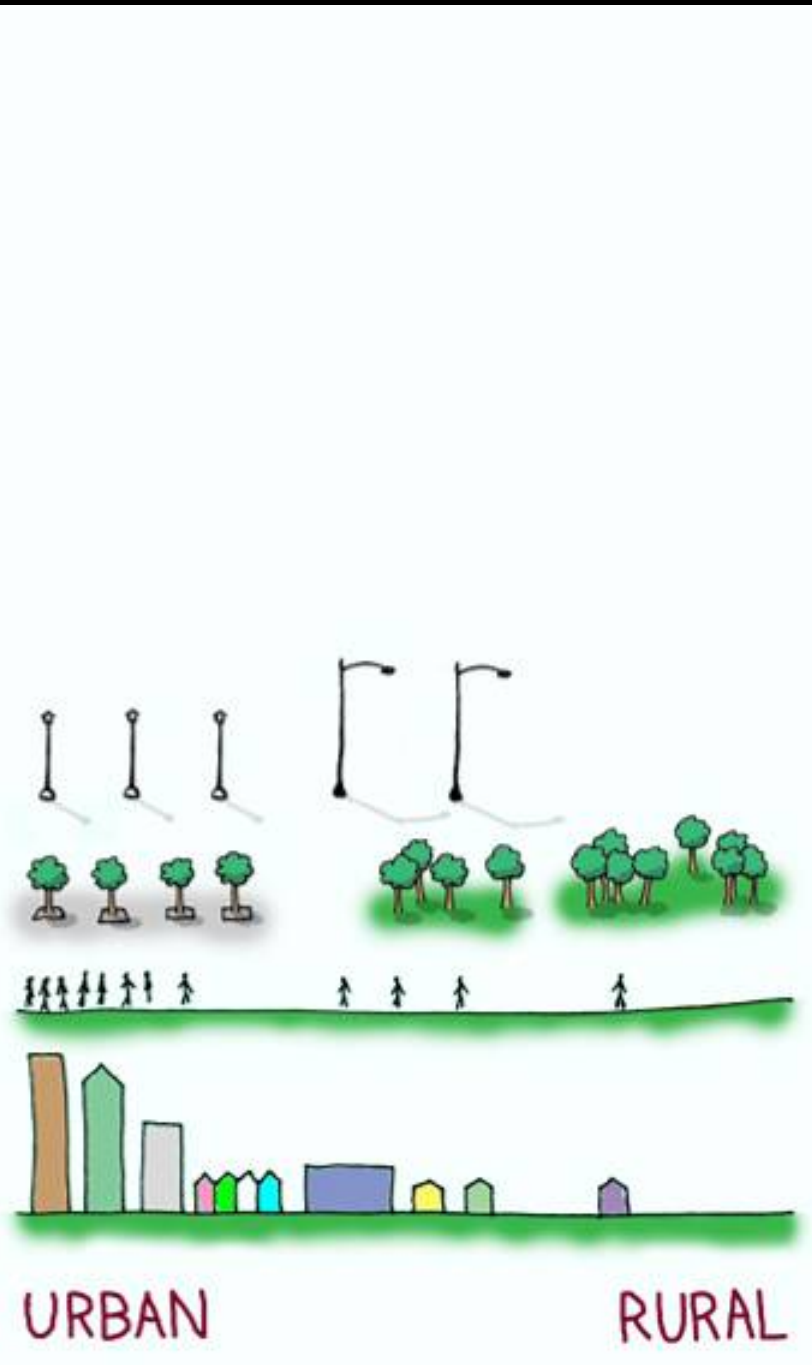


Trees

People

Buildings

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements



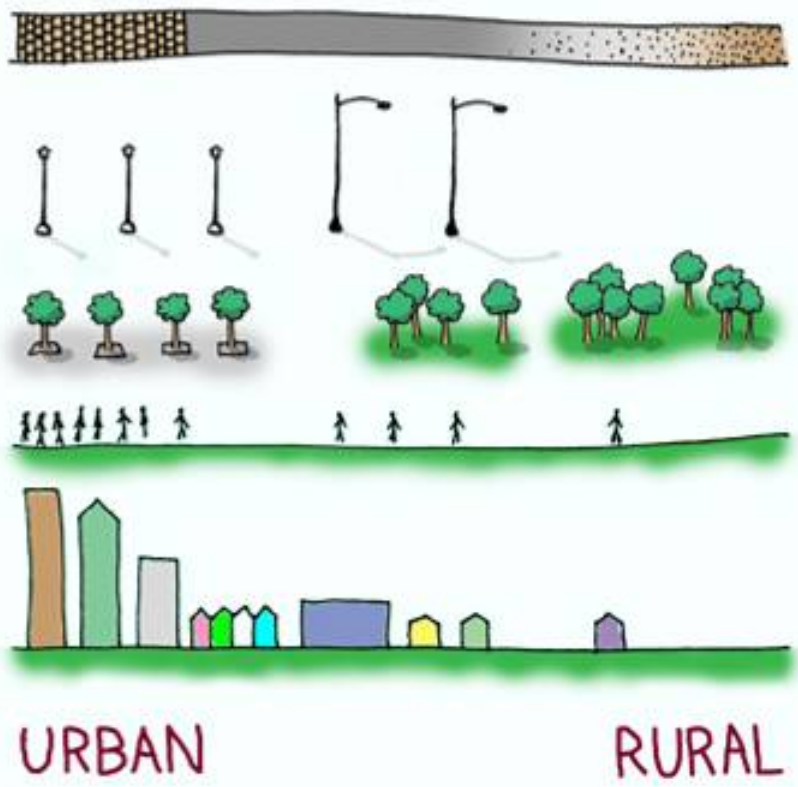
Lights

Trees

People

Buildings

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements



Paving Material

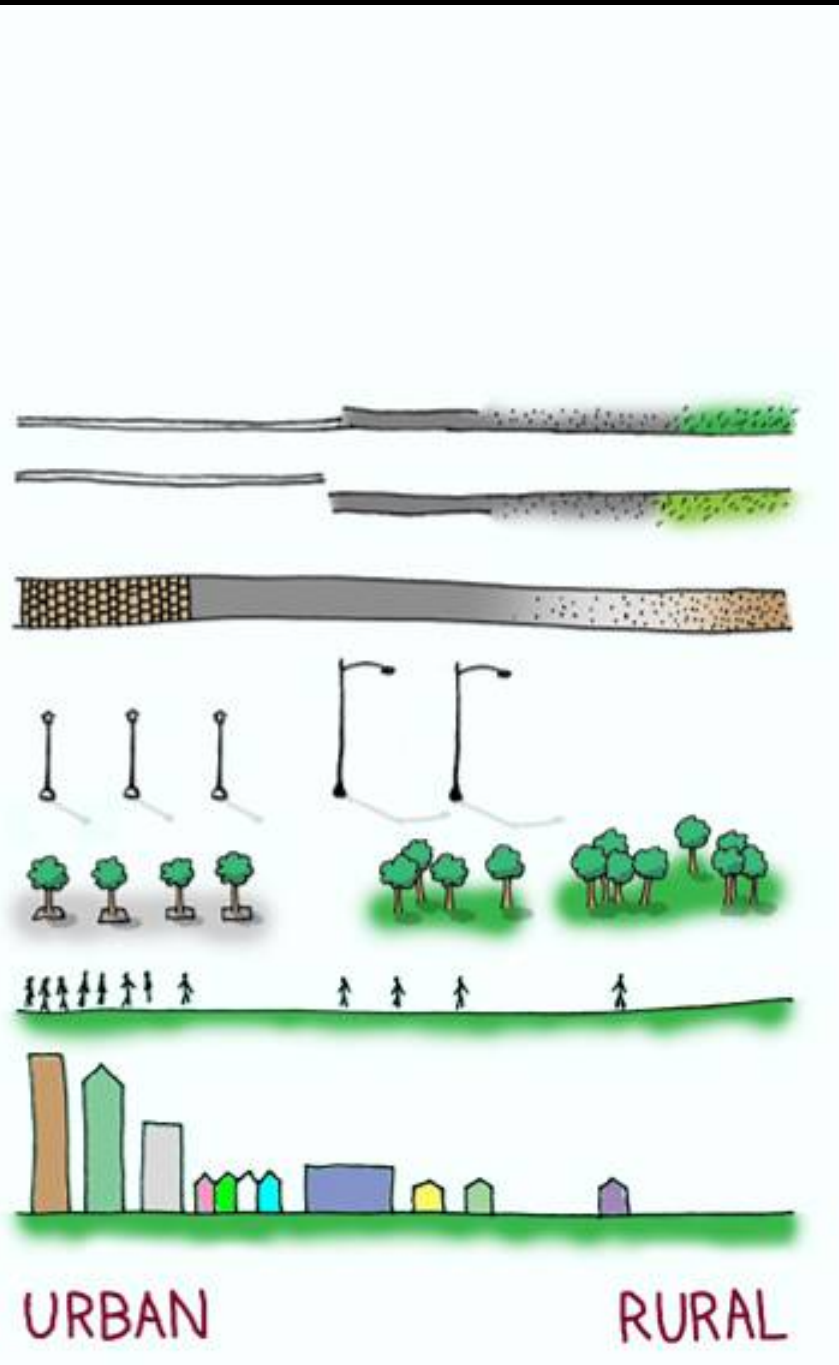
Lights

Trees

People

Buildings

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements



Drainage

Paving Material

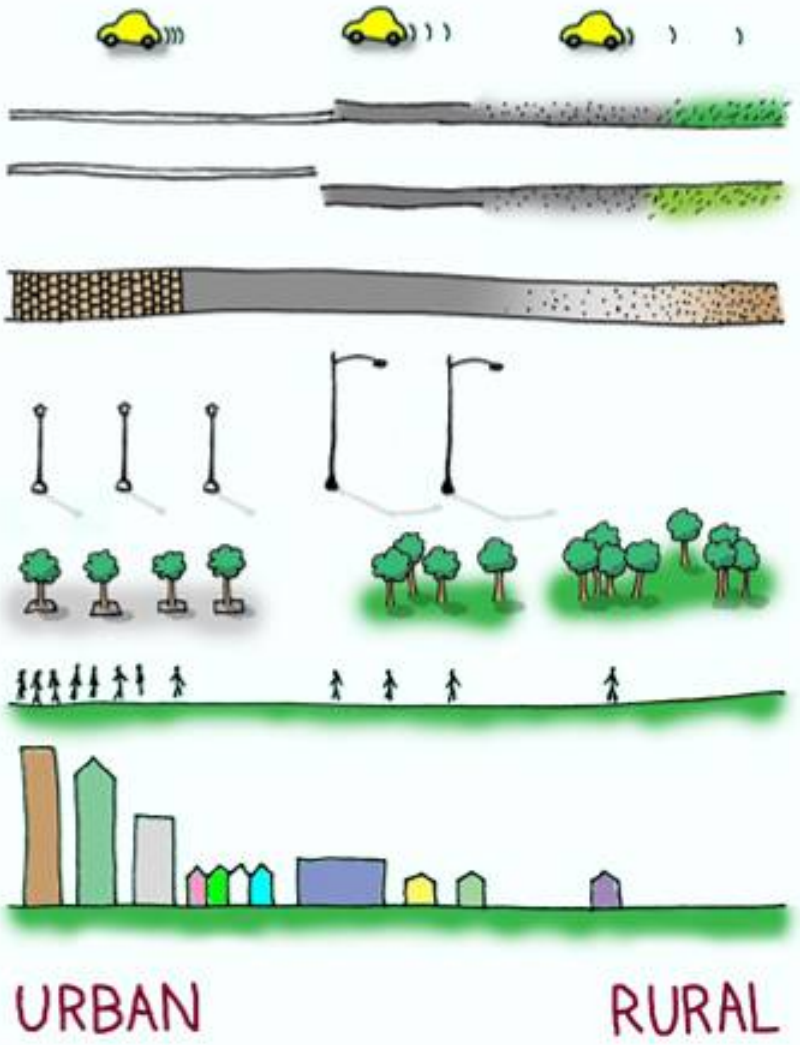
Lights

Trees

People

Buildings

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements



Speed

Drainage

Paving Material

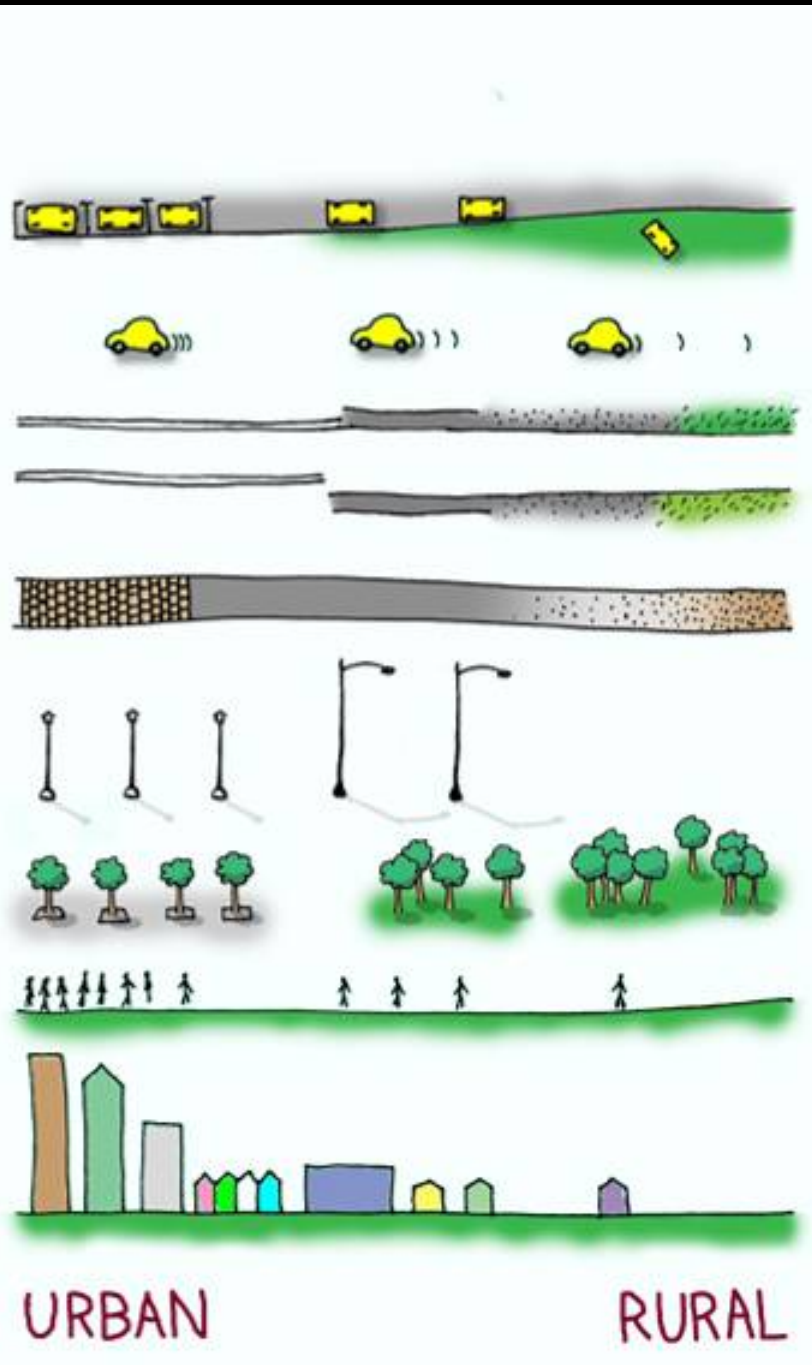
Lights

Trees

People

Buildings

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements



Parking

Speed

Drainage

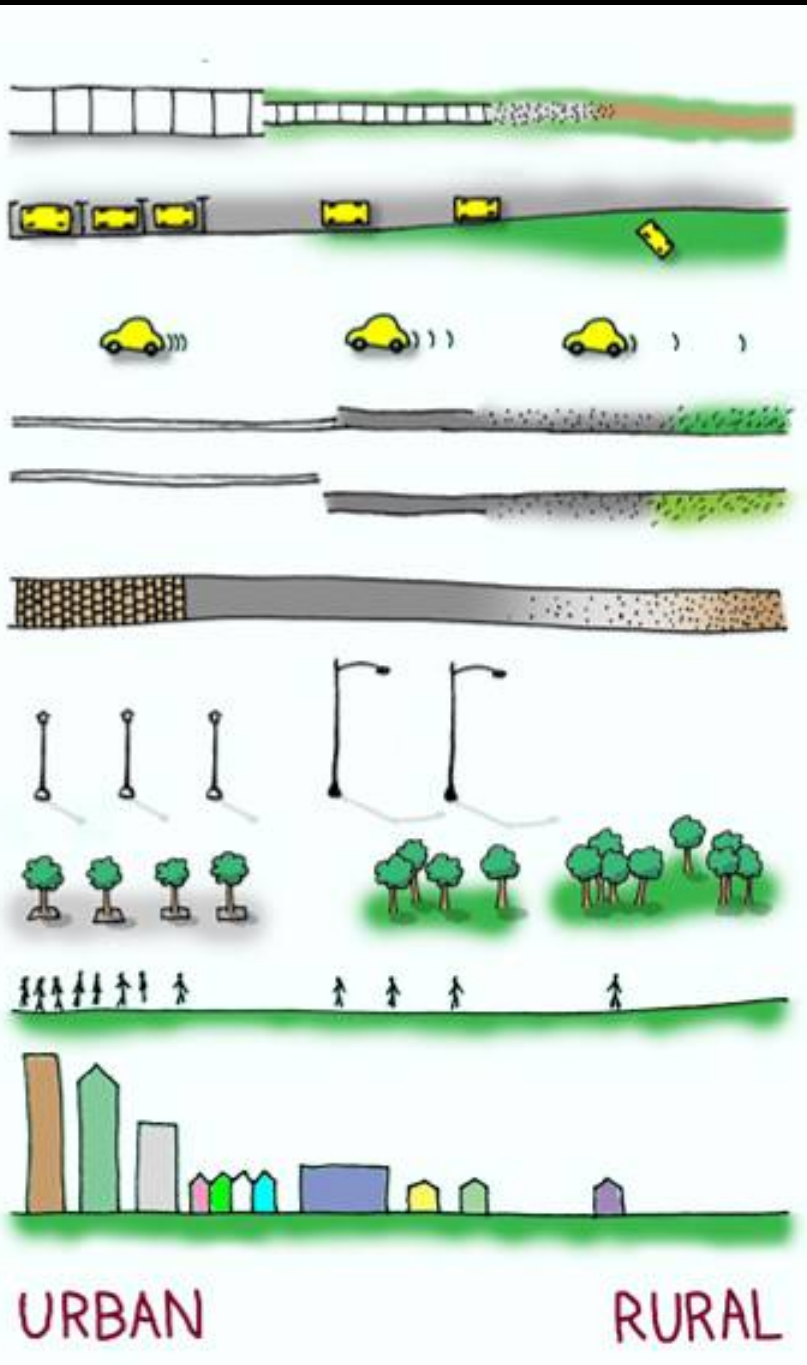
Paving Material

Lights

Trees

People

Buildings



Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements

Sidewalks

Parking

Speed

Drainage

Paving Material

Lights

Trees

People

Buildings

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Elements

Determine Functional Classification

Hierarchy & Functional Class
Context

then

Establish Design Controls

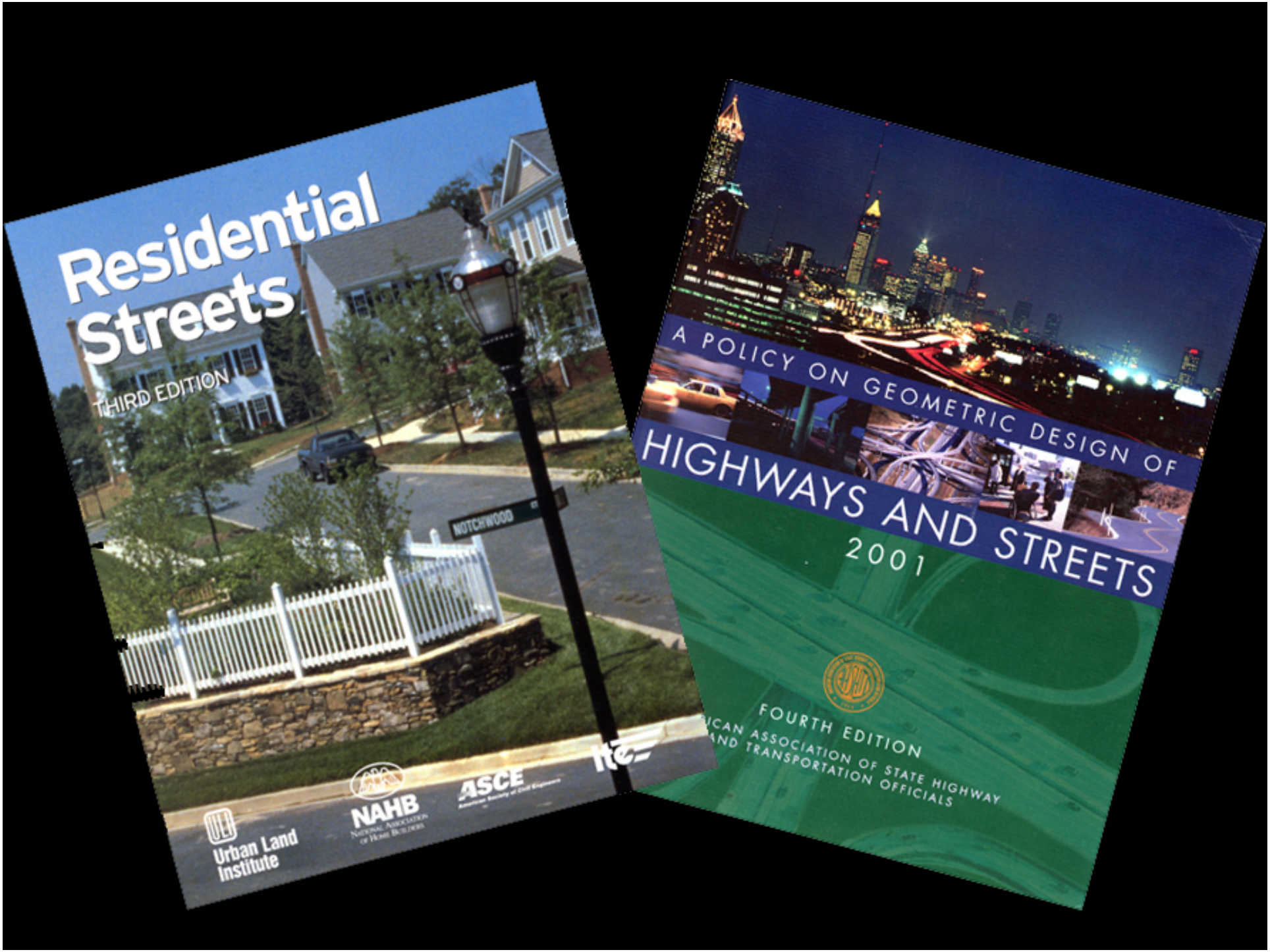
Design Traffic
- The Role of the Regional Model
- Understanding the Travel Patterns – Trip Types
- Vehicle Types
- Defining the Context - Network and Mode Choice
- Role of Micro-Simulation
- Interpreting the Results – Capacity & Travel Time

Design Speed
- Speed / Flow Relationship
- Roadway Safety
- Freight Routes
- Target Speed & Context

then

Fit Design Elements

Roadway Design Standards
- Geometric (Sight Distance / Stopping Distance)
- Dimensions
- Design Elements – Trees / Parking / Transit Stops
- AASHTO Design Guidelines
- State and Local Design Standards
- Design Variances and Exceptions


Residential Streets
THIRD EDITION
NOTCHWOOD
Urban Land Institute
NAHB
ASCE
A POLICY ON GEOMETRIC DESIGN OF
HIGHWAYS AND STREETS
2001
FOURTH EDITION

Reframing Key Transportation Conventions

DESIGN ELEMENTS – State & Local Design Standards

Determine Functional Classification

Hierarchy & Functional Class
Context

then

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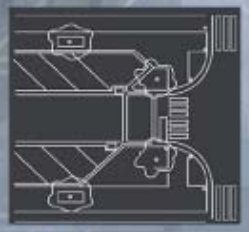
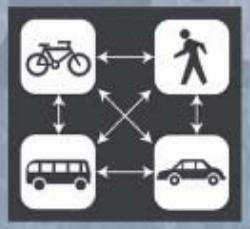
Reframing Key Transportation Conventions

DESIGN ELEMENTS – State & Local Design Standards





ALACHUA COUNTY

CORRIDOR DESIGN MANUAL

NOVEMBER 2002

Reframing Key Transportation Conventions
DESIGN ELEMENTS – Design Variance & Exceptions

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